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TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1936

No. 397

THE HENDERSON COMPANY, APPELLANT,

vs.

ERNEST O. THOMPSON, C. V. TERRELL AND LON A. SMITH, ETC., ET AL.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF TEXAS

FILED SEPTEMBER 15, 1936.

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[fol. 1] [Caption omitted]

[fol. 2]

IN UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF TEXAS, AUSTIN DIVISION

No. 535. In Equity

THE HENDERSON COMPANY, a Corporation, Complainant,

vs.

ERNEST O. THOMPSON et al., Defendants

BILL OF COMPLAINT—Filed July 31, 1935

To the Honorable Judges of Said Court:

Comes now The Henderson Company, a corporation, hereinafter called complainant, and complains of Ernest O. Thompson, C. V. Terrell and Lon A. Smith, composing and constituting the Railroad Commission of Texas, *the Railrocd Commission of Texas*, and William McCraw, Attorney General of Texas, hereinafter called defendants, and respectfully represents to the Court as follows:

I

The complainant is a private corporation, duly incorporated, organized and existing under the laws of the State of Maine, with a Permit to do business in the State of Texas, and is a resident citizen of the State of Maine, where it has its domicile.

II

The defendants, Ernest O. Thompson, C. V. Terrell and Lon A. Smith, are the duly elected, qualified and acting members of the Railroad Commission of the State of Texas and compose and constitute said Commission, which is an administrative board, organized and existing under the [fol. 3] Constitution and Laws of the State of Texas, and the defendant, William McCraw, is the duly elected, qualified and acting Attorney General of the State of Texas. The defendants are all citizens of the State of Texas and

they all reside in Travis County, in the State of Texas, and each maintains an office in the City of Austin in the State Capitol Building, where service of process may be had upon them. Travis County, Texas is situated in the Austin Division of the District Court of the United States for the Western District of Texas.

III

This Court has jurisdiction of this cause, for the following reasons:

(a) It is one arising under the Constitution and Laws of the United States, and

(b) There is a diversity of citizenship between the party complainant on the one hand and the parties defendant on the other, as above alleged, and the value of the property and property rights in controversy in this cause is in excess of the sum of $3,000.00, exclusive of interest and costs, as will more fully appear from the facts hereinafter alleged.

IV

Complainant is engaged in the business of manufacturing casinghead gasoline and owns and operates a casinghead gasoline manufacturing plant at the Town of Sanford, Hutchinson County, Texas. Complainant also is the owner and holder of a number of casinghead gas contracts entered into between complainant's predecessor and its assignors, and various owners of oil and gas leases in the vicinity of the location of complainant's plant, under the terms of which contracts complainant has agreed to purchase gas from the various wells located upon the leases covered by such contracts and to process such gas so purchased in its said casinghead gasoline manufacturing plant by extract- [fol. 4] ing the gasoline content contained in such gas therefrom, which gasoline content which amounts to approximately 35/100 of a gallon per 1000 cu. ft. of gas, when so extracted, becomes a highly valuable merchantable and usable product known as casinghead gasoline; that complainant has constructed and laid steel gathering pipe lines leading from its said plant to the various leases under contract with complainant to furnish it gas, as aforesaid, and that the total costs of complainant's investment, including the construction and erection of said casinghead gasoline

refining plant, its gathering pipe lines, storage and transportation equipment and facilities, is in excess of $500,000.00.

That by virtue and under the terms and provisions of said casinghead gas contracts, which complainant now owns and holds, covering said oil and gas leases, which will be hereinafter set out, the complainant owns and has become vested with an interest in the land upon which said leases are located and to which the same extends and covers.

V

That the land covered by the leases from which complainant has the right to receive the gas capable of being produced therefrom under its said contracts above mentioned, is located in what is known as the Panhandle gas field, which contains the largest known gas reservoir in the world. This field embraces approximately 1,200,000 acres and extends over six counties, towit: Moore, Potter, Hutchinson, Carson, Gray and Wheeler. Its length is approximately 125 miles and its width an average of approximately 30 miles. It contains approximately 800,000 acres known as "sweet gas", which is free from hydrogen sulphide, and approximately 400,000 acres known as "sour gas", which contains varying degrees of hydrogen sulphide; the sour gas area generally lies along the northern edge of said gas reservoir. This vast Panhandle field is underlaid by one single or [fol. 5] common reservoir of gas, and such gas over the entire field is found in the same producing horizon and such gas migrates from one portion of the field to another, depending upon the pressure conditions of such reservoir. There is no structural barrier between the sweet and sour gas areas in said reservoir, and the sweet gas will invade the sour gas area, and vice versa, dependent upon the pressure condition of the formation containing such gas. The wells connected with complainant's plant, and covered by said contracts above mentioned, are located in the sour gas area, and all of such wells contain varying degrees of hydrogen sulphide.

VI

That during the Forty-Fourth Regular Session of the Legislature of Texas there was enacted a bill known as House Bill 266, amending Article 6008 of the Revised Civil Statutes of Texas of 1925, as amended by Chapter 26, Acts

of the First Called Session of the Forty-Second Legislature, as amended by Chapter 100, Acts of the Regular Session of the Forty-third Legislature, as amended by Chapter 88, Acts of the First Called Session of the Forty-Third Legislature, which bill was approved by James V. Allred, Governor of Texas, on April 13, 1935, and became effective as of said date; that said Act, among other things, provides:

"Sec. 2. Unless the context otherwise requires, the words defined in this Section shall have the following meaning when used in this Article, towit: * * *

"(g) The term 'sour gas' shall mean any natural gas containing more than one and one-half grains of hydrogen sulphide per one hundred (100) cubic feet or more than thirty (30) grains of total sulphur per one hundred (100) cubic feet, or gas which in its natural state is found by the Commission to be unfit for use in generating light or fuel for domestic purposes.

"(h) The term 'sweet gas' shall mean all natural gas except 'sour gas' and 'casinghead gas'.

"(i) The term 'casinghead gas' shall mean any gas and/or vapor indigenous to an oil stratum and produced from such stratum with oil.

[fol. 6] "(j) The term 'natural gasoline' shall apply to gasoline manufactured from casinghead gas or from any natural gas. * * *

"Sec. 3. The production, transportation, or use of natural gas in such manner, in such amount, or under such conditions as to constitute waste is hereby declared to be unlawful and is prohibited. The term 'waste', among other things, shall specifically include: * * *

"(j) The use of sweet gas produced from a gas well for the manufacture of carbon black.

"(k) Permitting any natural gas produced from a gas well to escape into the air before or after such gas has been processed for its gasoline content. * * *

"Sec. 7. After the expiration of ten days from the time of encountering gas in a gas well, no gas from such well shall be permitted to escape into the air, and all gas produced therefrom shall be utilized for the following purposes:

"(1) No sweet gas shall be utilized except for:

(a) Light or fuel.

(b) Efficient chemical manufacturing, other than the manufacture of carbon black.

(c) Bona fide introduction of gas into oil, or gas bearing horizon, in order to maintain or increase the rock pressure or otherwise increase the ultimate recovery of oil or gas from such horizon.

(d) The extraction of natural gasoline therefrom when the residue is returned to the horizon from which it is produced.

"(2) In addition to the purposes for which sweet gas produced from a gas well may be used, sour gas may be used for efficient chemical manufacturing purposes, including the manufacture of carbon black, provided it is utilized in a plant producing a recovery of not less than one pound of carbon black to each one thousand (1,000) cubic feet of gas, and provided further that the gasoline content is removed and saved from such sour gas before the same is utilized for carbon black. * * *

"Sec. 10. It shall be the duty of the Commission to prorate and regulate the daily gas well production from each common reservoir in the manner and method herein set forth. The Commission shall prorate and regulate such production for the protection of public and private interests:

"(a) In the prevention of waste as 'waste' is defined herein;

"(b) In the adjustment of correlative rights and opportunities of each owner of gas in a common reservoir to produce and use or sell such gas as permitted in this Article.

"Sec. 11. The Commission shall exercise the authority to accomplish the purpose designated under item (a) of Section 10 when the presence or imminence of waste is supported by a finding based upon the evidence introduced at a hearing to be held as herein provided.

[fol. 7] The Commission shall exercise the authority to accomplish the purpose designated under item (b) of Section 10 when evidence introduced at a hearing to be held

as herein provided will support a finding made by the Commission that the aggregate lawful volume of the open flow or daily potential capacity to produce of all gas wells located in a common reservoir, is in excess of the daily reasonable market demand for gas from gas wells that may be produced from such common reservoir, to be utilized as permitted in this Article. * * *

"Sec. 16. It shall be unlawful for any person to produce gas from a gas well as herein defined in excess of the daily allowable production. The rate of production from any gas well shall be deemed to be the average daily rate of production for the month. * * *

"Sec. 19. If the Commission finds upon consideration of the evidence introduced at a hearing that either or both of the purposes designated under Section 10 of this Article may be more adequately accomplished by zoning a common reservoir, the Commission shall zone such common reservoir. If the Commission zones such common reservoir, each zone shall be regarded as a separate common reservoir in making allocations of daily allowable production as provided in this Article. The Commission shall allocate to each zone its just proportion of the market demand for gas from the common reservoir, and shall establish appropriate rules and regulations applicable to each zone and shall have the right to adjust its orders to the practicable conditions which exist and to enter any reasonable order which is necessary to effectuate the purpose of this law. The Commission is expressly authorized to segregate a sour gas area from a sweet gas area and shall not be required to restrict the allowable production of the sour gas zone to the same percentages that may be produced from the sweet gas zone. * * *

"Sec. 23. Any person violating any of the provisions of this Article shall be liable to a penalty not to exceed One Thousand ($1,000.00) Dollars for each offense, and each day's violation shall be a separate offense. Such penalty may be recovered by the State of Texas with the cost of suit in a civil action instituted in Travis County or the county where the violation occurred, by the Attorney General or by the county or district attorney; and any and all violations or threatened violations of this Article may be enjoined by any court of competent jurisdiction in which

the suit for penalty may be brought, and in such cases the court may issue such writs of injunction, mandatory or prohibitory, as the facts justify.

"Sec. 24. Any person may appeal for judicial review from any rule, order, or regulation of the Commission, made and promulgated under the authority conferred by this Article, in the same manner, upon the same conditions [fol. 8] and to the same court or courts as prescribed in this chapter for appeals from other rules, regulations or orders of the Commission, promulgated under the general oil conservation statutes of this State.

"Sec. 25. All laws or parts of laws in conflict with any of the provisions of this Act are hereby expressly repealed; provided, that on account of the absence of pipe lines necessary to accomplish transportation of gas to carbon black plants from many areas producing sour gas in one or more of the common reservoirs of this State and in as much as many wells producing sweet gas are without market outlet for gas used as light and fuel which will require considerable time to make connection after hearing to determine the allowable production, it is provided that gas from a well producing sour gas only may be utilized as provided in said Article 6008 of the Revised Civil Statutes of 1925, as amended by Acts of the First Called Session of the Forty-second Legislature, as amended by Acts of the Regular Session of the Forty-Third Legislature as aforesaid, until October 1, 1935, and the gas from a well producing sweet gas may be utilized as authorized under said Act as amended until August 1, 1935, at which time this Article shall be effective as to sweet gas wells; provided, however, that nothing in this Act contained shall repeal, modify, or impair any of the provisions of House Bill No. 782, relating to oil and gas conservation, enacted at this Session of the Legislature, or shall impair the power of the Commission, proceeding under the oil and gas conservation laws of this State, to prevent waste."

That, on July 20, 1935, pursuant to said Act, the defendants, Ernest O. Thompson, C. V. Terrell and Lon A. Smith, constituting the Railroad Commission of Texas, and to whom the enforcement of the provisions of said Act, by the terms thereof, were committed, made and promulgated a special order fixing the allowable production of sweet natu-

ral gas in the Panhandle district of Texas, and further ordering that no sweet gas shall be utilized except for:

(a) Light or fuel.

(b) Efficient chemical manufacturing, other than the manufacture of carbon black.

(c) Bona fide introduction of gas into oil or gas bearing horizon in order to maintain or increase the rock pressure or otherwise increase the ultimate recovery of oil or gas from such horizon;

(d) The extraction of natural gasoline therefrom when the residue is returned to the horizon from which it is produced, and

(e) The use as gas lift in the bona fide production of oil where such gas is not used in excess of 10,000 cubic feet per barrel of oil produced.

[fol. 9] A copy of said order is hereto attached, marked Exhibit "A", made a part hereof, and to which reference is here made for its full terms and provisions; that under the terms and provisions of said order said defendants have classified as "sweet", fourteen wells connected with complainant's plant, and from which complainant is entitled, under the terms and provisions of its said casing-head gas contracts above mentioned, to take sufficient gas to meet its full requirements for the purpose of processing the same in its said gasoline manufacturing plant, which wells are located upon the following described tracts of land situated in Hutchinson County, Texas, towit:

The North Half (N. ½) of the South 160 *a* acres of Section 81, Block 46, H&TC Ry. Co. Survey, known as the Deal Lease	1 well.
A 189½ acre tract of land lying along the South side of Sections 85, 86 and 87, known as the J. C. Whittenburg Survey No. 1, Block OB	2 wells.
The South Half (S. ½) of the South Half (S. ½) of the North Half (N. ½) of Section 85, Block 46, H&TC Ry. Co. Survey, known as the North American Lease	1 well.
The South 320 acres of the North 450 acres of Section 86, Block 46, H&TC Ry. Co. Survey, known as the North American-Shell Lease	1 well.

The Southwest Quarter (S. W. ¼) of the West Half (W. ½) of the North 80 acres of the South 320 acres of Section 83, Block 46, H&TC Ry. Co. Survey, known as the Polo Oil Company Lease	1 well.
The North Half (N. ½) and the Southeast Quarter (S. E. ¼) of the Northwest Quarter (N. W. ¼) of the North Half (N. ½) of the South 320 acres of Section 83, Block 46, H&TC Ry. Co. Survey, known as the Reliance Development Lease	1 well.
The North Half (N. ½) of the South 160 acres of Section 83, Block 46, H&TC Ry. Co. Survey, known as the Texorado Oil & Gas Company Lease	2 wells.
The North 160 acres of the South 240 acres of the North 400 acres of Section 87, Block 46, H&TC Ry. Co. Survey, known as the Great Plains Lease	1 well.
[fol. 10] Survey 1 SF 12952, D. Rubin Grantee	1 well.
Survey 5 SF 12956, D. Rubin Grantee	2 wells.
The North 80 acres of the J. T. Williams Survey No. 1, Certificate No. 1233, known as the Underwood, et al. Lease	1 well.

and that under the terms and provisions of said act and said order of the Railroad Commission, complainant is prohibited from taking and processing in its gasoline plant, from and after 7:00 o'clock a. m., August 1, 1935, any gas at all from said wells located upon said tracts of land above described, except such gas as it may re-introduce into the gas bearing formation, after the extraction of the gasoline content therefrom, which complainant says is impossible to do, for the reason that the cost of such operation would be prohibitive, in that the cost of re-introducing such gas in the formation from which it came would be many times more than the profit realized from extracting the gasoline content therefrom.

VII

Complainant further represents that of the oil and gas leases above described, and the gas wells thereon located, above mentioned, it has not only a vested interest therein by virtue of said casinghead gas contracts thereon and the

ensuing right to purchase the gas capable of being produced therefrom for the purpose of processing the same at its casinghead gasoline plant and extracting the gasoline content therefrom, which is a valuable right, but in addition thereto complainant is the outright owner of certain of said oil and gas leases above described, having acquired the same by purchase.

VIII

That under the provisions of said act above mentioned and referred to, a distinction is made between "sweet" and "sour" gas, although the same may be produced from one [fol. 11] common pool or reservoir, in that said act provides that sweet gas can be used for only certain restrictive purposes, as set out therein, specifically excluding the use of such gas for the manufacture of carbon black, and provides that sour gas may be used for all purposes for which sweet gas is allowed to be used, and in addition, sour gas may be used for manufacture of carbon black. That said act and the provisions thereof, insofar as they attempt to distinguish between sweet and sour gas and to restrict and limit sweet gas for the specific purposes therein set out, and to prohibit the use of sweet gas for the manufacture of carbon black, and particularly subdivisions (g) and (h) under Section 2, subdivision (j) under Section 3 and subdivision (l) under Section 7, are invalid for the following reasons:

(a) The restrictions placed upon the use of sweet gas by said act, in limiting its use for the specific purposes designated therein, and specifically prohibiting its use for the manufacture of carbon black, is unreasonable, arbitrary and capricious, and for which there is no justification in fact; and in restricting the use of "sweet" gas and specifically prohibiting the use thereof in the manufacture of carbon black, the Legislature of Texas acted unreasonably, arbitrarily, capriciously, and without fact justification.

(b) That the Legislature, in declaring by such act that the use of sweet gas for the manufacture of carbon black constitutes waste, acted arbitrarily, unreasonably and capriciously and without fact justification, and not only is there no basis in fact for such arbitrary conclusion on the part of the Legislature, but, in truth and in fact, carbon

black is an absolutely necessary commodity upon which the wellbeing of the general public must depend, and, in truth and in fact, there is no waste of gas in the efficient manufacture of carbon block.

[fol. 12] (c) That said act unreasonably discriminates between owners of sweet gas wells and owners of sour gas wells, located in a common pool or reservoir, in that it would permit a sour gas owner, who had a market for carbon black manufacture, to drain the gas from the sweet gas owner who had no market for light or fuel, or other uses prescribed for such gas in said act.

(d) That the definition of the term "sour gas", as contained in subdivision (g) of Section 2, is unreasonable, arbitrary, and for which there is no justification in fact, in that as a matter of fact gas containing any amount of hydrogen sulphide is not usable for light or fuel without first eliminating therefrom such sulphur content, and as a matter of fact there is no basic difference between sweet and sour gas produced from a common reservoir, as to its B.T.U. or heat content, or as to its carbon black productivity, the only difference between such gas being one of price, towit, the cost of eliminating the sulphur from such sour gas in the amount of approximately ¼ cent per thousand cubic feet.

(e) That said act denies to the owners of sweet gas wells equal protection of the law, and is therefore violative of the Fourteenth Amendment to the Constitution of the United States.

(f) That said act would permit the owner of a sweet gas well to be deprived of his property, without due process of law, and in violation of the Fourteenth Amendment to the Constitution of the United States and in violation of Section 19, Article I of the Constitution of Texas.

IX

Complainant represents to the Court that its said plant at Sanford, Texas is now connected to twenty-one (21) wells from which it is now receiving and processing, at its said plant, gas from such wells, not in excess of twenty-[fol. 13] five (25%) per cent of the open flow thereof, and that the total amount of gas that it is now receiving from

said wells is not sufficient to meet the daily requirements or capacity of said plant; and that said order of the Railroad Commission, in classifying fourteen (14) of said twenty-one (21) wells so connected with said complainant's plant as "sweet" gas wells, and prohibiting the complainant from taking gas therefrom for the purpose of manufacturing casinghead gasoline in its said plant, from and after August 1, 1935, would deprive complainant of the major portion of its gas requirements necessary to operate said plant, from and after August 1, 1935. In this connection, complainant avers that it has a contract with the Combined Carbon Company, which owns and operates a carbon black manufacturing plant near the Town of Sanford, Hutchinson County, Texas, and that under the terms of said contract between complainant and the said Combined Carbon Company, the complainant is bound and obligated to deliver to said Combined Carbon Company residue gas to the extent of the requirements of the said Combined Carbon Company; and the enforcement of said act and said order of the Railroad Commission will violate the provisions of Section 10, Article 1 of the Constitution of the United States, and Section 16, Article 1 of the Constitution of the State of Texas, in that it will so limit and restrict the production of complainant to the extent that its said contract with the Combined Carbon Company will be greatly impaired and placed in jeopardy, in that complainant's gas reserves will thereby have become lost by reason of the restrictive use of such gas as set out in said act and said order, and in the prohibiting of complainant in its use of gas from said wells so classified as "sweet" for the purpose of processing the same in its said plant and delivering [fol. 14] the residue thereof to Combined Carbon Company for the manufacture of carbon black. And further in this connection, complainant avers that it has a market for carbon black manufacture for the gas capable of being produced from said wells so classified as "sweet", under said order of the Railroad Commission, and that there will be no physical waste thereof.

X

Carbon black is made only from natural gas. It cannot be commercially manufactured from any other substance. The business of manufacturing carbon black from natural

gas is no innovation or experiment, but an established industry, which has been conducted in the United States since 1864. Its origin and growth were coincident with the development of the modern rotary printing press, requiring a thin, rapidly flowing ink of great covering power. Carbon black today is a stable and necessary commodity, and few manufactured products have such a range of utility. Its present uses are in the manufacture of printing ink, automobile tires, rubber footwear and heels, garden hose, phonograph records, golf balls, paints, carbon paper, typewriter ribbons, black and gray paper, books binders board, crayons, stove polish, shoe polish, tarpaulin, insulating material and colorings for cement, tile and artificial stone. Every newspaper of the United States is dependent upon the product of carbon black, and every rubber manufacturing company is dependent upon such product in order to furnish to the world the tires on the millions of automobiles that traverse the highways.

XI

Contrary to the arbitrary declaration of the Legislature, there is no waste in the manufacture of carbon black, and particularly is this true concerning the operations of the complainant. The complainant's gasoline refining plant [fol. 15] has been constructed of the latest and most approved appliances and machinery, for the purpose of extracting the gasoline content from such gas, without waste. And, likewise, the carbon black manufacturing plant of the Combined Carbon Company, with whom the complainant is under contract to furnish its requirements, has been constructed with the most efficient machinery and appliances known to the carbon black industry for the purpose of obtaining the maximum carbon black from the minimum amount of gas, and the gas from complainant's said wells above described is capable of producing from one and a quarter pounds to a pound and a half of carbon black per one thousand cubic feet.

XII

That said act, insofar as it contains the provisions thereof as hereinabove pointed out, is invalid and unconstitutional, in that the enforcement thereof will deny to the complainant the equal protection of the law guaranteed by

the Fourteenth Amendment to the Constitution of the United States, in that it will permit the owners of sour gas, coming within the definition of that term as contained in said act, to produce their gas for the purpose of manufacturing carbon black, while at the same time, the complainant will be prohibited from producing any gas from its said wells, classified as "sweet" gas wells by the Railroad Commission, as above pointed out, for the reason that the only appreciable available markets in the Panhandle of Texas and elsewhere in Texas, for nautral gas, are for domestic and industrial fuel consumption, and for the manufacture of carbon black, and that there are no markets for the other uses authorized by said act. That there is no general market in the Panhandle of Texas for the use of sweet gas for domestic and industrial fuel purposes, and the only gas [fol. 16] that is now being produced from the Panhandle field for such purposes, and particularly in the area of complainant's property, above described, is being produced by a number of large pipe line companies, which have heretofore acquired their markets in foreign states, have purchased outright a majority of the sweet gas producing areas in the Panhandle field, have built and constructed pipe lines from their leases to their markets, and have drilled their own wells and are producing their own gas for their own requirements. These constitute the only markets for light and fuel purposes, and such pipe line companies heretofore have refused, and now refuse, to purchase any gas from complainant, or said wells above described, and as a result of said act and the particular provisions thereof, herein complained of, if the same be enforced, will deprive complainant of its property and property rights, by permitting the gas underneath the complainant's property to be drained and drawn away through the sour gas wells authorized by said act to produce for the purpose of the manufacture of carbon black, and thus, said act unreasonably discriminates against the complainant and in favor of those sour gas owners, who have a market for their gas and are permitted to produce under said act and said order of the Railroad Commission, and the complainant therefore, is denied the equal protection of the law as guaranteed by the Fourteenth Amendment to the Constitution of the United States, and will be deprived of its property and property rights in the value of hundreds of thousands of dollars,

without due process of law, and in violation of the Fourteenth Amendment to the Constitution of the United States, and in violation of Section 19, Article I of the Constitution of Texas.

XIII

Said act and the order of said Railroad Commission, above referred to, are further invalid and unconstitutional, [fol. 17] in this:

(a) That Section 25 of said Act provides that all laws in conflict therewith are repealed, provided that, on account of the absence of pipe lines necessary to accomplish transportation of gas to carbon black plants from many areas producing sour gas in one or more of the common reservoirs of the state, and inasmuch as many wells producing sweet gas are without market outlet for gas used as light and fuel, and which will require considerable time to make connection after hearing to determine the allowable production, it is provided that gas from a well producing sour gas only, may be utilized as provided in Article 6008 of the Revised Civil Statutes of 1925, as amended by Acts of the First Called Session of the Forty-second Legislature, as amended by Acts of the Regular Session of the Forty-Third Legislature, until October 1, 1935; and that the gas from wells producing sweet gas may be utilized as authorized under said Act, as amended, until August 1, 1935, at which time said act shall be effective as to sweet gas wells. That said provision of said act discriminates against the complainant and its said property and property rights, in that it prohibits the complainant, from and after August 1, 1935, from taking gas from said wells above described, so classified by the defendants, constituting the Railroad Commission of Texas, as sweet gas wells, for the purpose of processing the same in its casinghead gasoline manufacturing plant and selling the residue thereof for carbon black manufacture, and at the same time authorizes adjacent owners to complainant's property, whose wells may be classified as sour gas wells, to produce, unrestricted, up to twenty-five per cent of the open flow thereof, for the purpose of manufacturing casinghead gasoline and blowing the residue thereof in the air until Oct. 1, 1935; and thus deprive and confiscate complainant's property and property [fol. 18] rights by drawing and draining gas underlying

complainant's property, when no provision is made by said Act, or the order of the Railroad Commission, to afford complainant a market for the purposes authorized by said Act for the use of said gas from said wells so classified as "sweet" gas wells. In this connection, complainant avers that the Panhandle field is underlaid by one common pool of gas; that there is no structural barrier between the sweet and sour gas area; that the withdrawal of gas from the sour gas area will decrease the rock pressure in the sweet gas area and affect the ultimate recovery from such area.

(b) That there is no fact justification for the discrimination made in said Act in prohibiting the use of sweet gas under the provisions of Article 6008, as amended, prior to the time that the sour gas is prohibited to be further utilized under Article 6008, as amended. Further in this connection, complainant avers that there are now not any pipe line facilities connecting wells that were unconnected at the time of the passage of said Act, with the pipe line companies, for the purpose of marketing such gas for light and fuel purposes, and that at the present time no connection are being made with heretofore *un*connected wells for the purpose of marketing such gas for light and fuel purposes; and the pipe line companies who constitute the sole market for such purposes are not offering to make any such connections, and are not offering any market for such purposes. That the enforcement of said provisions of said Act, and the order of the Railroad Commission, as above mentioned, made in pursuance thereof, against complainant and its property and property rights will amount to a denial to the complainant of equal protection of the law, as guaranteed by the Constitution of the United States, and will amount to a taking and confiscation of complainant's [fol. 19] property and property rights, without due process of law, as guaranteed by the Fourteenth Amendment to the Constitution of the United States, and by Section 19, Article I of the Constitution of Texas.

XIV

That under Section 7, Article 14 of the Constitution of Texas, and under the decisions of the Supreme Court of the State of Texas, construing said constitutional provision, which has become a rule of property in Texas, complainant has the right to produce gas from its said wells

and to utilize the same for useful and lawful purposes, provided that in doing so it does not commit actual physical waste of such natural resource. That there is no waste in complainant's operation of its said property and the utilization of its said gas from said wells, so designated as sweet gas wells, in its said casinghead gasoline plant, and the marketing of the residue therefrom to the Combined Carbon Company for the purpose of manufacturing carbon black. That said use by complainant of its said gas is a lawful use, and that the same does not conflict with the public interest, but on the other hand, such use is necessary for the wellbeing of the general public, and public necessity does not, and did not, at the time of the passage of said Act, require or authorize the Legislature of Texas to so interfere with complainant's property and its lawful use thereof, by arbitrarily and unreasonably denying to complainant the use of such gas in its said casinghead gasoline plant for the purpose of extracting the gasoline content therefrom and the marketing of the residue thereof for the manufacture of carbon black, which complainant avers is the only market that it has or can obtain for the use of said gas, and the enforcement of the provisions of [fol. 20] said Act and said order of the Railroad Commission of Texas will amount to destruction and complete denial of complainant's property right to produce its said gas and to utilize the same for useful purposes, without actual physical waste thereof, and will amount to a complete taking and confiscation of complainant's property without due process of law, in violation of the Fourteenth Amendment to the Constitution of the United States and said Section 7, Article 14 of the Constitution of the State of Texas.

XV

That the enforcement of said Act in the particulars hereinabove complained of, and said order of said Railroad Commission, will amount to the denial to complainant of the right to produce and utilize its gas, even though it shall do so without the commission of waste, and to dedicate its said gas, so classified by said Commission as "sweet" gas, to a public use, without payment or compensation therefor, all of which is in violation of Section 17, Article I of the Constitution of the State of Texas.

XVI

Complainant further represents to the Court that subdivision (g) under Section 2 of said Act, which defines sour gas to be any natural gas containing more than one and one-half (1½) grains of hydrogen sulphide per one hundred cubic feet, or gas which, in its natural state, is found by the Commission to be unfit for use in generating light and fuel for domestic purpose, is invalid and void, for the following reasons:

(a) That such classification is unreasonable, arbitrary and without fact justification therefor, for the reason that as a matter of fact gas containing any degree of hydrogen sulphide is not fit to be used for domestic fuel purposes, without first having eliminated said sulphur content from such gas, and that there is practically no difference in the cost of eliminating a small degree of sulphur or an excessively large amount of sulphur from natural gas, [fol. 21] and after the same has been eliminated such gas is as fit and usable for domestic fuel purposes as gas that is absolutely free from even a trace of sulphur in its natural state. That, in truth and in fact, there is no basic difference between sweet and sour gas, either in its B. T. U. or heat content or its carbon black productivity..

(b) That said provision of said act is unreasonably discriminatory in its operation, in this:

That those owning wells falling within the classification of said act as "sweet" gas wells, but yet containing a certain amount of hydrogen sulphide, will be unable to find a market for light and fuel purposes for the gas produced from such wells, and will be unable to utilize the same for such purposes until after they have gone to the expense of eradicating such sulphur content therefrom; whereas, those owning wells falling within the classification of "sour" gas, although they would not be forced to go to any more expense in eradicating the sulphur from their gas, in order to make it fit for domestic fuel purposes, yet are not required to do so, but are authorized to utilize such gas in the manufacture of casinghead gasoline and carbon black.

(c) That as a matter of fact there is no difference between sweet and sour gas, as defined in said act, but one of price, towit: approximately one-fourth (¼¢) cent per thousand cubic feet, which would cover the cost of eradicat-

ing the sulphur content from such gas, irrespective of the amount contained therein.

XVII

All of the wells above described belonging to, or from which complainant has the right to take the gas therefrom, for the purpose of processing the same in its said casing-head gasoline plant, contain hydrogen sulphide, and with [fol. 22] the exception of two, which hereinafter will be referred to, all of said wells contain less than one and one-half grains of hydrogen sulphide per one hundred cubic feet, but contain sufficient amount of hydrogen sulphide which would deny and preclude complainant from marketing the same for light and fuel purposes, were complainant successful in obtaining a market therefor, until said sulphur content had been eradicated therefrom, and thus complainant, if said act and said order of the Railroad Commission be enforced, as against it, will be discriminated against in favor of those owners of sour gas wells, who own the same character of commodity, and which is just as fit as the gas capable of being produced from complainant's said wells for the purposes for which the Legislature of Texas attempted to dedicate such gas, and the use thereof; and thus, complainant will be denied the equal protection of the law as guaranteed by the Fourteenth Amendment to the Constitution of the United States.

XVIII

That the provisions of said act herein complained of, and said order of the Railroad Commission, arbitrarily takes and appropriates a large portion of said sour gas area and a majority of complainant's reserves, to the uses set out in said act and said order, which complainant says amounts to a dedication to and limitation of use, for only one purpose, towit: light and fuel, since the other authorized uses mentioned in said act and order either are impractical or impossible of performance, frivolous and valueless to the owners of such gas; and in truth and in fact such gas in its natural state is not fit to be utilized for light and fuel purposes. That the only possible market for such purposes in the Panhandle field are the large gas pipe line companies who own their own reserves, have drilled their own wells, have obtained their own markets,

[fol. 23] and constructed their own pipe lines, and such pipe line companies have refused to purchase such gas from complainant and others similarly situated, and said act and said order of the Railroad Commission nowhere requires said pipe line companies to purchase and utilize complainant's said gas so classified by said Commission as sweet, above mentioned, and said act and said order nowhere provide a market to complainant and others similarly situated, for such gas for the purposes authorized by said act; that there is in truth and in fact no other market for the use of said gas so classified as sweet for the purposes authorized by said act and said order, and if said provisions of said act herein complained of, and said order of the Commission, be enforced against complainant, it will have the effect of appropriating and confiscating complainant's said property and property rights in favor of said pipe line companies, by dedicating such gas from complainant's said wells and complainant's reserves, to the restricted use for light and fuel purposes, which is under the absolute control and domination of said pipe line companies, and who may or may not offer complainant a market, but who have refused up to this time at least, to do so, and in all probability in the future will continue to refuse to do so, and said gas and gas reserves so appropriated will furnish reservoir energy for the users of said gas for light and fuel purposes, and the withdrawal from the sweet and sour gas areas will decrease the rock pressure underneath complainant's properties above described, and thereby will lower and decrease the possible ultimate recovery of gas thereunder, and complainant's said gas in time will be drained and appropriated by the users of light and fuel on the one hand and those owners of gas which may contain an infinitis-mally greater amount of hydrogen sulphide than the gas of complainant, but sufficient to come within the arbitrary classification of said act as sour gas. Thus, complainant and its said property and property rights, will be discriminated against in favor of both the [fol. 24] users of sweet gas for light and fuel, and the users of sour gas, as defined in said act, for the manufacture of carbon black, while at the same time, complainant will be denied a market for any purpose; that if the provisions of said act herein complained of, and said order of the Commission, be enforced against the complainant and its said property and property rights, it thereby will suffer loss

of said property and property rights and impairment of contracts, in good faith made for lawful use, prior to the passage of said act and the promulgation of said order, and will be denied the equal protection of the law, and thus will be damaged and injured to the extent of hundreds of thousands of dollars, all in violation of the Fourteenth Amendment to the Constitution of the United States, Section 10, Article 1 of the Constitution of the United States, and Sections 16, 17 and 19, Article 1 of the Constitution of Texas.

XIX

Complainant further represents to the Court that it acquired its said property above described and made and entered into said gas contracts above mentioned, and said residue contract with the Combined Carbon Company, above set forth, and built and constructed its said plant and gathering system long prior to the passage of said act and the promulgation of said act and said order of the Railroad Commission; that said contracts and property were acquired by complainant in the then known sour gas area of said Panhandle field because of the known fact that said properties above described were located in the sour gas area and contained hydrogen sulphide to the extent that such gas capable of being produced therefrom was unfit and unusable for light and fuel purposes; and in this connection, complainant avers that at no time in the past have the pipe line companies, which constitute the only market for light and fuel purposes mentioned in said act, ever offered any market to complainant for the gas from its prop-
[fol. 25] erty, or to the other lease owners under contract with complainant, aforesaid, or to any other owners in the vicinity of complainant's property in the Sanford district, whose gas contained hydrogen sulphide in a similar degree as the gas of complainant, above mentioned. That under said contracts, complainant is under obligation to continuously take said gas from said property and to process the same in its casing-head gasoline manufacturing plant, and its failure to do so will subject said contracts to cancellation.

XX

Complainant further represents that said order of the Railroad Commission, dated July 20, 1935, herein men-

tioned and referred to, is invalid and void for all the reasons hereinabove assigned, as to the validity of said provisions of the act herein complained of, and that in addition thereto, said order is further invalid and void, for the following reasons:

(a) That said order is invalid upon its face, in that it does not disclose any fact condition which would justify the Railroad Commission of Texas to promulgate such an order, and in this connection complainant avers that Sections 10 and 11 of said act provide as follows:

"Sec. 10. It shall be the duty of the Commission to prorate and regulate the daily gas well production from each common reservoir in the manner and method herein set forth. The Commission shall prorate and regulate such production for the protection of public and private interests:

"(a) In the prevention of waste as 'waste' is defined herein;

"(b) In the adjustment of correlative rights and opportunities of each owner of gas in a common reservoir to produce and use or sell such gas as permitted in this Article.

"Sec. 11. The Commission shall exercise the authority to accomplish the purpose designated under item (a) of Section 10 when the presence or imminence of waste is supported by a finding based upon the evidence introduced at a hearing to be held as herein provided.

[fol. 26] "The Commission shall exercise the authority to accomplish the purpose designated under item (b) of Section 10 when evidence introduced at a hearing to be held as herein provided will support a finding made by the Commission that the aggregate lawful volume of the open flow or daily potential capacity to produce of all gas wells located in a common reservoir, is in excess of the daily reasonable market demand for gas from gas wells that may be produced from such common reservoir, to be utilized as permitted in this Article:"

which Sections of said act contain the only provisions conferring authority on the Railroad Commission of Texas to promulgate any order limiting and prorating the production of gas in the State of Texas; that the Commission is pow-

erless to make and promulgate such an order except under authority of the provision of said act which authorizes such an order in two events: (1) In the prevention of waste as "waste" is defined herein; (2) in the adjustment of correlative rights and opportunities of each owner of gas in a common reservoir to produce and use or sell such gas as permitted in said act. Section 11 of said act provides that the Commission is authorized to prorate the production of such gas under subdivision (a) above, when the presence or imminence of waste is supported by a finding based upon the evidence introduced at such hearing, and that the Commission is authorized only to promulgate any order limiting the production or prorating the same, under subdivision (b) above, when the evidence introduced at such hearing will support a finding made by the Commission that the aggregate lawful volume of the open flow or daily potential capacity to produce of all gas wells located in the common reservoir is in excess of the daily reasonable market demand of such gas from said wells. That said order of said Commission nowhere shows or discloses that the same is based upon any finding of fact authorized by either of said above subdivisions (a) and (b); that there is no fact finding in said order on the part of said Commission that [fol. 27] there is waste or imminence of waste in the Panhandle field or that the daily potential capacity to produce of said wells is in excess of the market demand and said order therefore is not based on any facts authorized by said act to permit the promulgation of such an order.

(b) That said order shows upon its face that the Commission did not take into consideration any wells or gas capable of being produced therefrom, located in the sour gas area of the Panhandle field, in arriving at the total market demand and the total allowable production.

(c) That said order nowhere provides for the allocation of wells, heretofore unconnected, to the various markets for which said wells are permitted to produce, does not provide for connection, nor direct who shall make the connection, and nowhere determines what is a fair price for such gas, as required by said act.

(d) That as a matter of fact, no fact justification exists in the Panhandle field for the promulgation of such order prorating and limiting the production of gas under subdivi-

sion (a) contained in Section 10 of said act, for the reason that gas, unlike oil, cannot be stored and must be marketed as produced, and other provisions of said act prohibit the wastage of such gas into the air, and the performance of other acts constituting waste as therein defined, and as a matter of fact gas cannot be produced beyond the market requirements and facilities therefor, so as to constitute waste.

(e) That said sections 10 and 11 of said act, under authority of which said proration order was issued, are void and unconstitutional, in this:

(1) That said provisions are unreasonable and arbitrary, for which there is no basis in fact; that as a matter of fact [fol. 28] limitation or proration of production could not lessen or prevent waste, for gas, unlike oil, must be utilized as produced and said act elsewhere in its provisions prevents the wastage of said gas into the air and otherwise in the operation and utilization of the same, and said act nowhere attempts to define that unequal withdrawals in the same reservoir constitute waste, and if it did, there would be no basis of fact therefor.

(2) That said provisions of said act are no more than an attempt to force ratable purchase or ratable take on the part of those who, through their own efforts, have acquired and established their own market, and to force those with markets to share the same with others who have no market, and the enforcement of the provisions of said act therefore would be violative of Section 10, Article I, and the Fourteenth Amendment of the Constitution of the United States, and Sections 16 and 19 of the Constitution of Texas.

(3) That said sections of said act are in conflict with and violative of Section 17, Article 14 of the Constitution of Texas and the rule of property in this state.

(f) That said order of said Railroad Commission is further void, in that it divides the Panhandle field into two zones, without fact justification therefor, and authorizes different allowables in the two zones, which provision of said order is based on Section 19 of said act, which section of said act is invalid for the reason that it lays down no rule nor yardstick which shall govern the Commission in attempting to create different zones in a common reservoir.

XXI

Complainant further represents to the Court that under Section 8 of said act, it is the duty of all persons, com- [fol. 29] panies, or corporations producing natural gas, to make certain tests of their gas wells, in the presence and under the supervision of a representative of the Railroad Commission of Texas, and that during the early part of July, 1935, complainant, in company with a representative of the Railroad Commission, designated for such purpose, took and made various tests upon the wells above described, connected with complainant's plant, as to the volume of open flow, the rock pressure, and sulphur content; that such tests were made on the two wells located upon the Texorado Oil & Gas Company lease, covering the North Half (N. ½) of the South 160 acres of Section 83, Block 46, H&TC Ry. Co. Survey, Hutchinson County, Texas, hereinabove referred to, and that in such tests so made under the supervision and direction of the representative of the Railroad Commission, it was found and determined that such gas contained more than one and one-half grains of hydrogen sulphide per one hundred cubic feet, and pursuant to the tests so made on said wells, said wells were classified by the Commission as "sour" gas wells, and for this reason were not included in the order of the Railroad Commission issued to all operators in the Panhandle area, fixing the gas well potentials in the sweet gas area of the Panhandle district, and notwithstanding such tests so made, and the fact that such gas from said two wells contained more than one and one-half grains of hydrogen sulphide per one hundred cubic feet, as determined by said Railroad Commission, yet in the last order of said Railroad Commission above referred to and herein complained of, said two wells are classified as sweet gas wells, and the complainant is prohibited by such order from processing any amount of gas therefrom in its said casinghead gasoline plant. Complainant says that said last classification of said two wells was arbitrary upon the part of the Rail- [fol. 30] road Commission of Texas, and without fact justification, and that if said order of said Railroad Commission be enforced against it, complainant will be denied to utilize any of the gas capable of being produced from said two wells in the manufacture of casinghead gasoline, and the sale of the residue thereof for carbon black manufac-

ture, even though complainant, under said act, if valid, would be entitled so to utilize the same. That said order, insofar as it applies at least to said two wells, is void and invalid.

XXII

Section 23 of said act provides that any person violating any of the provisions of said act, or orders, shall be liable to a penalty not to exceed $1,000.00 for each offense, and each day's violation shall be a separate offense, such penalty to be recovered by the State of Texas in a suit instituted in Travis County or in the county wherein the violation occurred, by the Attorney General, or by the county or district attorney, with the consent of the Attorney General. That said penalty statute is harsh, drastic and unreasonable, and, complainant alleges, was inserted in said act for the purpose of intimidating this complainant, and persons and concerns similarly situated, from resisting and opposing said statute for fear such harsh and unreasonable penalties might be inflicted. That said penalty section and the threat therein contained to this complainant violates both Federal and State Constitutions, and denies to this complainant the protection of the due course of the law of the land clause of the Constitution of the State of Texas.

XXIII

The complainant further represents to the Court that said provisions of said act as herein complained of, and said order of said Railroad Commission issued on July 20, 1935, effective at 7:00 o'clock a. m., August 1, 1935, made [fol. 31] and promulgated in pursuance to said provision of said act are unconstitutional, invalid and void, as against this complainant, in the manner and for the reasons hereinabove set forth, and that said defendant, members of the Railroad Commission of Texas, and the defendant, William McCraw, Attorney General of Texas, being the officers who are, under said act, charged with its enforcement, are threatening to, and will, enforce said provisions of said act and said order of said Railroad Commission upon the effective date thereof, as against the complainant herein; that complainant has no adequate remedy at law whereby it can protect itself against the provisions of said act herein complained of, and against the enforcement of said order of

the Railroad Commission, promulgated thereunder. That great and irreparable injury and loss, amounting to many thousands of dollars, will be suffered by this complainant if said act and order are enforced against it, in that this complainant will suffer the deprivation of its liberty of contract, loss of property, impairment of its contract, and other wrongs and injuries as alleged in this bill, and such loss, injury and damage can only be avoided and prevented through the enjoining of the enforcement of the provisions of said act and said order of the Railroad Commission herein complained of; or in the alternative, the complainant will be forced to operate in violation of the provisions of said act herein complained of, and said order, and thus incur the danger of having to defend against harassing suits for penalties, receivership and other litigation directed at complainant with the view of forcing it to comply with said act and said order. In the event complainant should attempt to operate in violation of said act and such order, the defendants, composing the Railroad Commission, [fol. 32] no doubt will direct the defendant, William McCraw, the Attorney General of Texas, to file such penalty suits, and to institute such other litigation against complainant, with the view of forcing complainant to observe and obey said act and the order of said Railroad Commission, and the defendant, William McCraw, Attorney General of Texas, in all probability, will file such penalty suits, injunction proceedings, and other litigation against this complainant, and complainant will, in that event, be forced to incur the tremendous expense and costs incident to the defense of such suits, to its irreparable damage.

XXIV

Complainant says that if said act and order of the Railroad Commission be enforced against it and its said property, it will be denied the use of said property and the right to take gas therefrom, in the same proportion that sour gas owners are permitted by said act to produce, and process the same in its said gasoline manufacturing plant at a loss to complainant in excess of $800.00 per day, which complainant could and would receive from said utilization of said gas from said wells so classified as sweet wells in said order; that in addition thereto, complainant will be required to shut down a major portion of its plant, with resulting

depreciation and deterioration thereof, and will ultimately lose its property and property rights and its contracts will be greatly impaired as hereinabove set out. That unless a temporary restraining order is immediately issued by this Honorable Court complainant will be irreparably injured and damaged in thousands of dollars, as above mentioned, before a Three Judge court can be constituted as required by the judicial code and notice given to said defendants and a hearing had.

Wherefore, premises considered, complainant prays:

[fol. 33] First. That pending a hearing on the application of complainant for temporary or interlocutory injunction, as hereinafter prayed for, this Honorable Court issue a temporary restraining order restraining and enjoining the defendants, and each of them, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act either with or under them, from enforcing or attempting to enforce by order, rule, regulation, or otherwise, the provisions of said act herein complained of, and all other orders similar thereto, having for their purpose and effect the prohibiting of complainant from producing and utilizing in its said casinghead gasoline manufacturing plant, gas from said wells so classified by the Railroad Commission as "sweet" gas wells, and hereinabove described, until October 1, 1935, and as long thereafter as the residue of such gas is utilized in the efficient manufacture of carbon black.

Second. That pending the hearing of the application of complainant for temporary or interlocutory injunction as hereinafter prayed for, that this Honorable Court issue a temporary restraining order, restraining and enjoining the defendants, and each of them, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act with or under them, from enforcing or attempting to enforce by order, rule, regulation or otherwise, the provisions of said act, hereinabove complained of, and said order of said Railroad Commission, insofar as they affect the two wells located upon the Texorado Oil & Gas Company lease, hereinabove specifically described, and the right of complainant to take and receive and utilize the gas produced therefrom in its said casinghead gasoline plant.

[fol. 34] Third. That a three judge court be constituted, as provided by the judicial code, and that upon hearing before such three judge court, complainant be granted a temporary or interlocutory injunction, restraining each and all of the defendants, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act with or under them, from enforcing or attempting to enforce by order, rule, suit, regulation, or otherwise, the provisions of said act herein complained of and said order of the Railroad Commission of Texas, or any other order similar thereto, that may be hereafter promulgated by the defendants, composing the Railroad Commission of Texas, to the same purport and end as temporary restraining order is prayed for, as hereinabove set forth.

Fourth. That upon final hearing, complainant have judgment declaring the provisions of said act herein complained of and said order of said Railroad Commission void and unenforceable and unconstitutional, together with a decree perpetually enjoining the defendants, and each of them, from any act or effort to enforce the provisions of said act herein complained of and said order of said Railroad Commission promulgated thereunder, to the same purport and end as complainant has prayed for temporary restraining order, as hereinabove set forth, and from collecting or attempting to collect from complainant any penalties for violating the provisions of said act herein complained of and said order of said Railroad Commission promulgated thereunder, and any orders similar thereto, and perpetually restraining the defendants, and each and all of them, from instituting or causing to be instituted any suit directed against this complainant for any violation of said statute or orders aforesaid.

Fifth. That complainant have judgment against the de-
[fol. 35] fendants, and each of them, for costs of suit, and for all equitable relief, general and special, to which complainant may show itself justly entitled.

(Signed) L. M. Fischer, Amarillo, Texas; (Signed) F. W. Fischer, Tyler, Tex., Attorneys for Complainant.

[fols. 36-39] *Duly sworn to by F. C. Hall. Jurat omitted in printing.*

[fol. 40] EXHIBIT "A" TO ORDER OF COMMISSION

Railroad Commission of Texas

Panhandle District

Rose Building—Pampa

West Gas Field

Daily Gas Well Allowables

Sweet Gas Area

(640 Acres)

Effective 7 A. M. August 1, [illegible]5, and Until Further Notice

The daily allowable of Sweet Natural gas is expressed in thousands of cubic feet and computed at four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit; correction made for pressure according to Boyle's Law, and for specific gravity according to test made by the balance method.

No Sweet gas shall be utilized except for: (a) Light or fuel, (b) efficient chemical manufacturing, other than the manufacture of carbon black, (c) bonafide introduction of gas into oil, or gas bearing horizon, in order to maintain or increase the rock pressure or otherwise increase the ultimate recovery of oil or gas from such horizon, (d) the extraction of natural gasoline therefrom when the residue is returned to the horizon from which it is produced, (e) the use as gas lift in the bona fide production of oil where such gas is not used in excess of 10,000 cu. ft. per barrel of oil produced.

Approved by: Gordon M. Griffin, Chief Petroleum Engineer, Oil & Gas Division, Railroad Commission of Texas, Austin, Texas.

[fol. 41] August 1, 1935.

Key to Abbreviations

Connected to Pipe Lines:

CON	Continental Oil Company.
CRG	Canadian River Gas Company.
CSP&L	Central States Power & Light Company.
CSG	Cities Service Gas Company.
DIX	Dixon Creek Oil & Refining Company.
HUM	Humble Oil & Refining Company.
GU	Gulf Production Company.
K	Killion Gas Company—Borger.
LS	Lone Star Gas Company.
LP	Luther Pierson—Kingsmill.
NA	North American Oil & Gas Company.
PEPL	Panhandle Eastern Pipe Line Company.
PP&L	Panhandle Power & Light Company.
PU	Producers Utilities Corporation.
TEX	The Texas Co.
TIPL	Texas Interstate Pipe Line Company.
TNG	Texoma Natural Gas Company.
WTG	West Texas Gas Company.
FUEL	Farmer Connections, etc.
N.P.	Not Prepared, etc.

Connected to Gasoline Plants:

C	Cargray Corporation.
Cd	Crawford Gasoline Corporation.
Co	Coltexo Corporation.
D	Danciger Oil & Refineries, Inc.
E	Empire Gas & Fuel Company.
Hg	Hagy-Harrington-Marsh.
H	F. C. Henderson Company.
Ind.	Independent Pipe Line Company.
M	Magnolia Petroleum Company.
PA	Pacific American Gasoline Corporation.
Ph	Phillips Petroleum Company.
Po	Portland Gasoline Corporation.
Sh	Shell Petroleum Company.
Sk	Skelly Oil Company.
Su	Sunray Oil Company.

Market Nomination for Amend — 189,113 M C F daily
50 Market Nominated 021,963.4 Potential Factor
comm well Potentials
50 Market Nominated 1,884,683 Acreage Factor
comm well acres
Well Potential x Potential Factor Potential allowable
Well Acres x Acreage Factor Acreage Allowable
Sum of Potential and Acreage Allowables Individual daily well allowable

fol 42 Hutchinson County

Company	Well No	Lease	Acres	Potential	Acreage Allow	Potential Allow	Well Allow	Conference
Deal O&G	3	Sanford	40	1,209	63 5	131 6	195 1	11
Henderson	1	Con White	180	11,853	190 5	370 6	561 1	11
Henderson	2	Con White		NP				11
Henderson	1	N Amer Sanford	80	13,000	127 0	406 6	533 6	11
Henderson	1	Sanford	160	27,039	254 0	845 1	1,099 1	11
N Amer Shell	1	Payne	320	083	508 1	30 7	538 8	11
Pelo Oil Co	1	Sanford	20	23,354	31 8	730 2	762 0	11
Reliance	1	Sanford	20	13,483	31 8	421 6	453 4	11
Ruben	2	Ruben	10	8,904	16 0	280 3	296 3	11
Ruben	3	Ruben	10	19,435	16 0	607 6	623 6	11
Ruben	1	Ruben	20	20,187	31 8	631 2	663 0	11
Underwood et al	1	Johnson	40	11,270	63 5	446 2	509 7	11
Venerado	2	Sanford	40	32,500	63 5	1,018 0	1,081 5	11
Venerado	1	Sanford	40	11,242	63 5	351 5	415 0	11

[File endorsement omitted.]

(fol 43) IN UNITED STATES DISTRICT COURT

[Title omitted]

ORIGINAL ANSWER—Filed August 30, 1935

To the Honorable Judge of Said Court:

Now come the respondents in the above entitled and numbered cause and answering complainant's bill of complaint filed herein say:

1

Respondents neither deny nor affirm the allegations contained in paragraph one of said bill, because they are without knowledge as to such facts.

2

Respondents admit the allegations contained in paragraph two of said bill of complaint

3

Respondents deny that portion of paragraph three of said bill of complaint designated as subdivision (a), wherein it is alleged that this cause is one arising under the Constitution and laws of the United States.

Respondents neither deny nor admit those allegations contained in paragraph three of said bill of complaint, [fol. 41] because they have no knowledge of the facts therein alleged.

4

Respondents neither deny nor admit those allegations contained in paragraph four of said bill of complaint wherein it is alleged that complainant is engaged in the business of manufacturing casinghead gasoline, and owns and operates a casinghead gasoline manufacturing plant in the town of Sanford, Hutchinson County, Texas; but allege the facts to be that complainant is engaged in the business of manufacturing and operating a stripping or absorption plant in Hutchinson County, Texas, from which plant natural gasoline is processed from natural gas produced and procured by complainant from wells situated in the Panhandle field in Texas.

Respondents neither deny nor admit those allegations contained in paragraph four of the bill of complaint wherein it is alleged that complainant is also the owner and holder of a number of casinghead gas contracts entered into between complainant's predecessor and its assignors and various owners of oil and gas leases in the vicinity of the location of complainant's plant, because these respondents are with knowledge as to such facts.

Respondents neither deny nor admit those allegations contained in paragraph four of said bill of complaint wherein it is alleged that complainant has agreed to purchase gas from the various wells located upon the leases covered by such contracts, and to process such gas so purchased in its said ca-sing-head manufacturing plant; and respondents neither deny nor admit those allegations con-

tained in paragraph four of said bill wherein it is alleged that complainant has constructed steep pipe lines for the purpose of comprising a gathering system to be used in collecting said gas for its said plant, because respondents [fol. 45] are without knowledge as to such facts.

5

Respondents admit those allegations contained in paragraph five of said bill wherein it is alleged that the Panhandle gas field is the largest known gas reservoir in the world, and alleges that said field embraces approximately 1,500,000 acres and extends over six counties, and that said field is approximately 140 miles in length and has an average width of ten miles; and that said field contains approximately one million acres known as productive of sweet gas, which is free from hydrogen sulphide; and approximately 400,000 acres productive of sour gas, which does contain varying degrees of hydrogen sulphide. And in this connection respondents admit, as alleged in paragraph five of said bill, that it is commonly known and recognized by experts and technicians that the Panhandle field is underlaid by one single or common reservoir of gas, and that such gas underlying the entire field is found in the same producing horizon, and that such gas can migrate from one portion of the field to another; but in this connection these respondents say, that portion of said field known and designated as the East Panhandle Field and that portion known and designated as the West Panhandle Field are separated by a narrow area with a very low pressure, and that it is not probable or likely that gas will migrate from that area known and designated as the East Panhandle Field, to that area known and designated as the West Panhandle Field.

These respondents deny that portion of paragraph five of said bill of complaint wherein it is alleged that wells connected with complainant's plant are located in the sour gas [fol. 46] area, and further deny that all of such wells contain varying degrees of hydrogen sulphide; but on the contrary allege the facts to be that thirteen of complainant's wells are located in the sweet gas producing area, and do not contain a sufficient degree of hydrogen sulphide to prevent the use of such gas so produced from said thirteen wells for light and fuel, and for other purposes to which

sweet gas might be used; and that eight of complainant's wells are sour gas wells, in that said eight wells produce gas which contains more than one and one-half grains of hydrogen sulphide to one hundred cubic feet or more than thirty grains of total sulphur per one hundred cubic feet; and that all gas produced from said eight wells is unfit to be used for light and fuel and is unfit to be used for the other purposes to which sweet gas may be used.

6

Respondents admit the allegations contained in paragraph six of said bill of complaint wherein it is alleged that the 44th Regular Session of the Legislature of Texas enacted a bill known as H. B. 266, and that pursuant to said H. B. 266 on July 20, 1935, the Railroad Commission of Texas adopted and promulgated its order of that date prorating the Panhandle gas field and covering and prorating the production of sweet gas therefrom; and in this connection these respondents say, that said order of July 20, 1935, was amended, readopted and repromulgated in its entirety by the Commission dated August 1, 1935, and said order of August 1, 1935, was amended, readopted and repromulgated on August 5, 1935, and that a copy of said amended order as readopted and repromulgated by said Commission is hereto attached and marked "Exhibit A", and that no changes were made in the body of said order, and the body of said order contains no different or other [fol. 47] provisions than those contained in said original order dated July 20, 1935, and that the only changes made by said Commission in said order dated August 1, 1935, and said order dated August 5, 1935, was to find considerable more facts and place said fact findings in the face of said order.

Respondents neither deny nor affirm those allegations contained in that portion of paragraph six of said bill of complaint wherein a description of fourteen of complainant's wells is given, because they are without knowledge as to such fact; but in this connection respondents say, that only thirteen of complainant's wells have been designated by the Railroad Commission of Texas as productive of sweet gas, and eight of said wells have been designated by said Commission as productive of sour gas; and that this description was made by the Railroad Commission of Texas

pursuant to the provisions of H. B. 266 enacted by the Regular Session of the 44th Legislature of Texas, wherein said act provided that all gas wells producing gas containing in excess of one and one-half grains of hydrogen sulphide per one hundred cubic feet or in excess of thirty grains of total sulphur per one hundred cubic feet or otherwise unfit to be used as sweet gas should be designated as sour gas; and that pursuant to said definition and under said provisions contained in said act, the Raiload Commission of Texas, the respondents herein, conducted tests and made analyses of the gas produced from complainant's wells, and as a result of said investigation and of said analyses found that thirteen of complainant's wells were productive of sweet gas as that term is defined in said act, and that eight of said complainant's wells are productive of sour gas as that term is defined in said act.

[fol. 48] Respondents deny that portion of paragraph six in said bill of complaint wherein it is alleged that it would be impossible to return the tail or residue gas after the natural gasoline has been extracted therefrom to the horizon from which it is produced; but on the contrary allege the facts to be that in the Panhandle field where said wells are not producing from a very deep horizon, and that where the bottomhole or rock pressure in said wells is not in excess of 400 pounds, that repressuring is feasible, practicable, possible and can be economically accomplished.

7

Respondents deny in its entirety paragraph seven of said bill of complaint.

8

Respondents deny those allegations contained in paragraph eight of the bill of complaint wherein it is alleged that the distinction made by said act of the Legislature, known as H. B. 266 making a distinction between sweet and sour gas, and providing the uses to which each may be put, and providing that sweet gas cannot be used in the manufacture of carbon black, is invalid and unconstitutional; and further deny that said act in that respect, or in any other respect, is arbitrary, unreasonable or unconstitutional; but on the contrary allege the facts to be that said act wherein a distinction is made by the act to which sour gas and sweet

gas may be put is a valid and constitutional exercise of the police power of the State in its effort to conserve its natural resources and to prevent the waste thereof. In this connection respondents would show to the court that natural gas containing in excess of 1½ grains of hydrogen sulphide per one hundred cubic feet, or in excess of 30 grains of total sulphur per one hundred cubic feet is unfit and impracticable [fol. 49] to be used for light and fuel, or for chemical manufacturing and other uses to which sweet gas may be put; and that there is a growing demand, and such demand will continue to grow, for sweet gas to be used as light and fuel; and the Legislature of Texas in the enactment of H. B. 266, which prohibited the use of sweet gas for any other purposes than light, fuel, efficient chemical manufacturing, reintroducing into an oil producing well for the purpose of furnishing a gas lift, or returning the tail or residue gas after the natural gasoline had been extracted therefrom to the horizon from which it is produced, was adopted to conserve the natural resources of Texas, and to conserve and prevent the waste thereof of its vast gas reserves in the State; and that to permit the use of sweet gas, as that term is defined in said act and has been defined heretofore in this answer, for all purposes to which sour gas might be put would quickly deplete and dissipate said reserves and the market for light and fuel and other beneficial purposes to which sweet gas can be put or used would be destroyed and such market could not be supplied. On the other hand, that gas which contains in excess of 1½ grains of hydrozen sulphide per one hundred cubic feet or in excess of 30 grains of total sulphur is unfit to be used for light and fuel, unless and until it goes through an expensive treatment to remove the objectionable elements and ingredients therefrom; and under the provisions of said act such sour gas might be utilized for all the purposes permitted for the utilization of sweet gas, and in addition thereto such gas could be used for the manufacture of carbon black after the gasoline content had been extracted therefrom.

Respondents deny in their entirety paragraphs (a), (b), (c), (d), (e) and (f) contained in paragraph eight of said [fol. 50] bill of complaint.

9

Respondents deny those allegation- contained in paragraph nine of the bill of complaint wherein it is alleged that

complainant under the provisions of said order of the Commission, and under the provisions of said act of the Legislature, cannot produce sufficient gas from its said wells to supply its carbon black plant and to supply its market for sweet gas, and that the classification of its said wells by the Railroad Commission of Texas, wherein 13 of its said wells were classified as productive of sweet gas, and eight of its said wells were classified as sour gas wells, and that under the provisions of said proration order, combined with such classification, it cannot supply the needs of its said carbon black plant; but on the contrary respondents allege the facts to be that under the provisions of said proration order promulgated by the Railroad Commission of Texas, wherein complainant's 13 wells, which had been classified as sweet gas wells, could only produce approximately 7,500,000 cubic feet of natural gas per day; that such amount of sweet gas is sufficient to supply all the market that complainant has for sweet gas; and that said eight wells classified by the Commission as sour gas wells are capable of producing more than enough sour gas to supply said carbon black plant when said carbon black plnt is operating at its full capacity. In this connection these respondents say, that under said proration orders complainant can produce from said 13 wells, classified by the Commission as sweet gas wells, approximately 7,500,000 cubic feet of gas per day, and that complainant has a market among the various plants and leases in said field for approximately 8,000,000 cubic feet of sweet gas per day to be used for light and fuel in said plants and on said leases as aforesaid; and that said [fol. 51] carbon black plant owned and operated and under the direction and control of complainant, known as the Combine Carbon Company, is capable of utilizing approximately 30,000,000 cubic feet of sour gas per day, and that complainant's eight wells producing sour gas are capable of producing sufficient gas to supply said carbon black plant. That the provisions of H. B. 266 as applied to sour gas does not become effective until October 1, 1935, and that the Railroad Commission of Texas has not and cannot place said eight wells producing sour gas belonging to complainant on any character of allowable or prorate said wells in said field producing sour gas until October 1, 1935, and that this complainant has no grounds to complain against any order of the Railroad Commission of Texas or against any act of

the Legislature of Texas, because he has not been injured, damaged or affected thereby.

10

Respondents neither deny nor admit the allegations contained in paragraph ten of said bill of complaint.

11

Respondents deny those allegations contained in paragraph eleven of the bill of complaint wherein it is alleged that the declaration of the Legislature contained in H. B. 266 that waste is permitted by the use of sweet gas in the manufacture of carbon black; but on the contrary allege the facts to be that the use of sweet gas in the manufacture of carbon black is a wasteful utilization of such gas, because sweet gas may be used for so many useful and beneficial purposes, and that there is such a great demand for such gas, that to permit its use in the manufacture of carbon black would deplete and exhaust the sweet gas reserve in the State and deprive the State of a market for such sweet gas; and in this connection respondents say, that there is [fol. 52] an abundant supply of sour gas which cannot be used for light and fuel and for other uses to which sweet gas may be used in the gas fields in Texas, and that said sour gas can be used in the manufacture of carbon black, and to permit the use of sweet gas for the manufacture of carbon black would constitute waste thereof in view of said facts.

12

Respondents deny those allegations contained in paragraph twelve of the bill of complaint wherein it is alleged that the provisions of H. B. 266 are invalid and unconstitutional, in that the enforcement thereof will deny to complainant an equal protection of the law guaranteed by the Constitution of the United States, in that it will permit the sour gas producers in said field to utilize the sweet gas in the manufacture of carbon black and will prevent this complainant from using its said sweet gas in the manufacture of carbon black; and further deny those allegations contained in said paragraph twelve which allege that there is no general market in the Panhandle of Texas for the use of sweet gas for domestic and industrial fuel purposes;

but on the contrary allege the facts to be that this complainant has a market for light and fuel for approximately 8,000,000 cubic feet of sweet gas, and that said market exists in the various plants located in the Panhandle field and on the leases located therein; and that under the provisions of said proration order promulgated by the Railroad Commission of Texas it is allowed to produce from its said sweet gas wells approximately 7,500,000 cubic feet of gas per day, which almost supplied its market for sweet gas, and that such a market is available to this complainant. In this connection respondents would show to the court that complainant owns or controls and is operating the Combine Carbon Company, and that it has eight sour [fol. 53] gas wells capable of producing sufficient gas to supply the needs and demands of said carbon black plant; and respondents deny all of those allegations contained in paragraph twelve of the bill of complaint wherein it is alleged that said act discriminates against this complainant or is unconstitutional and invalid.

In this connection respondents say, that the classification made by the legislature of Texas in said H. B. 266 of sour gas wells and sweet gas wells is a fair, just and reasonable classification, in that natural gas containing in excess of 1½ grains of hydrogen sulphide per one hundred cubic feet is very corrosive and is unfit for use as light and fuel, and that gas containing in excess of 30 grains of total sulphur per one hundred cubic feet is likewise unfit for light and fuel use; and also in this connection respondents say that natural gas containing less than 1½ grains of hydrogen sulphide per one hundred cubic feet or less than 30 grains of total sulphur per hundred cubic feet of gas is fit to be used as light and fuel without further treatment; that practically all of the wells producing gas in the Panhandle field, both in the East zone and the West zone, either produce gas which contains less than one grain of hydrogen sulphide or which produces gas containing in excess of two grains of hydrogen sulphide, and that any gas which contains less than one grain of hydrogen sulphide per one hundred cubic feet of gas can be used for light and fuel and is acceptable for such purposes; that the pipe line company supplying the market for light and fuel in natural gas are taking gas from said field containing slightly less

than 1½ grains of hydrogen sulphide per one hundred cubic feet of gas and that it is not necessary to treat said gas before the same may be transported to a light and [fol. 54] fuel market. These respondents further say that all of the wells producing gas in the Panhandle reservoir from tests and analyses made by the Commission it was found that less than seven or eight of some 1200 wells contained hydrogen sulphide between one and two grains, and that the classification made by the Legislature between sour and sweet gas was a fair, just and reasonable classification; these respondents would further show that of all 21 wells owned by complainant and producing in said field only one of said wells produces gas which contains between one and two per cent of hydrogen sulphide to one hundred cubic feet of gas.

13

Respondents deny in its entirety paragraph thirteen of complainant's bill of complaint.

In this connection respondents say that the provisions of said H. B. 266 which permits the production of sour gas as it has heretofore been produced until October 1, 1935, operates beneficially to this complainant, in that this complainant owns and produces eight sour gas wells and that for a period of two additional months it may produce said eight sour gas wells to an amount sufficient to supply its said needs, and that there is no discrimination between the producers of sweet gas and sour gas by virtue of the statute permitting the producers of sour gas to continue to produce their wells without being placed on allowables and without having said wells prorated until October 1, 1935. The reasons the Legislature had in making these provisions were that there were a number of carbon black plants scattered throughout the producing area of the Panhandle field, and that some of these carbon black plants were far removed from sour gas supply or from sour gas wells, and that the Legislature had in mind permitting these carbon [fol. 55] black plants to either move into those sections of the field adjacent to wells producing sour gas or to give such carbon black manufacturers time within which to lease or install their gathering systems to such wells producing sour gas in order that such gas might be used in the manufacture of carbon black.

In this connection respondents would show to the court, that this portion of said act permitting the production of sour gas without proration until October 1, 1935, operates beneficially to the complainant, in that it can produce its wells to sufficient amount to supply its said demands.

14

Respondents deny in its entirety paragraph fourteen of complainant's bill of complaint.

15

Respondents deny in its entirety paragraph fifteen of complainant's bill of complaint.

16

Respondents deny in its entirety paragraph sixteen of the bill of complaint.

In this connection respondents say that natural gas containing less than 1½ grains of hydrogen sulphide per one hundred cubic feet of gas can be utilized for light and fuel, and that the pipe lines transporting such gas from the Panhandle reservoir to the light and fuel markets have been buying and accepting and transporting gas containing slightly more than 1½ grains of hydrogen sulphide per one hundred cubic feet of gas to be used for light and fuel, and that gas containing less than that amount has been and is now being used and can in the future be used for light and fuel without the necessity of treatment thereof for the purpose of removing such hydrogen sulphide. In [fol. 56] this connection these respondents say that very few, if any, of the gas producing wells in the Panhandle reservoir contain between one and two grains of hydrogen sulphide per one hundred cubic feet of gas, and that none of said wells contain in excess of two grains or less than one grain thereof, and as a matter of fact only one of complainant's 21 wells contains an amount of hydrogen sulphide between one and two grain- per one hundred cubic feet of gas, and that the amount of hydrogen sulphide in the 13 wells belonging to complainant described as sweet gas is infinitesimal and of no consequence and will not require any character of treatment to remove the hydrogen sulphide therefrom before it can be used as light and fuel or other uses to which sweet gas may be put.

17

Respondents deny in its entirety paragraph seventeen of the bill of complaint.

18

Respondents deny in its entirety paragraph eighteen of the bill of complaint.

In this connection respondents say, that the wells producing gas in the Panhandle reservoir will not drain nor deplete the reserves beneath complainant's lands, in that all such wells will be placed on proration and each well will be allowed a certain allowable above which said well cannot produce under the provisions of said order, and those wells which are supplying the pipe line company with gas for the light and fuel market will not drain gas from beneath land of this complainant, but complainant will be producing gas ratably from its said land to its pipe line and in proportion to the same amount so drained by other pipe lines, and it will be able to protect its rights in such common pool or reservoir. In this connection respondents [fol. 57] say that complainant has a market for light and fuel for approximately 8,000,000 cubic feet of such sweet gas, and that it does produce and will continue to produce its allowable from its said 13 wells producing sweet gas for the purpose of supplying a market for light and fuel, and that said wells belonging to the other producers of gas which are adjacent to and near the leases owned by complainant will likewise be producing ratably from their said wells and no drainage will occur.

19

Respondents deny in its entirety paragraph nineteen of the bill of complaint.

20

Respondents deny those allegations contained in paragraph twenty wherein it is alleged that the order promulgated by the Railroad Commission of Texas dated July 20, 1935, did not contain in its face sufficient fact findings to authorize the promulgation of said order based upon the provisions of H. B. 266, which defined the reasons upon which such order could be issued and promulgated by the Commission; but on the contrary allege the facts to be

that said order dated July 20, 1935, was promulgated by the Railroad Commission of Texas after due and proper notice had been given and published in accordance with the provisions of the statutes and after a hearing had been conducted before such Commission, at which hearing evidence was introduced and the testimony of witnesses was heard and a record was made showing the necessity for the promulgation of such order for the prevention of waste, and in the protection of the correlative property rights of the owners of said common pool of gas, and that every provision of the statute was complied with, and said order recited [fol. 58] that waste was imminent and was taking place in the Panhandle field and that there was a necessity for such order to accomplish the provisions of said statute to be promulgated, and the order on its face shows sufficient fact findings for the promulgation thereof, and was made pursuant to and in compliance with said act of the Legislature, and that said order dated July 20, 1935, contains the following fact findings:

"Whereas, in conformity to House Bill No. 266, passed at the Regular Session of the 44th Legislature of the State of Texas, the Commission after due notice has held hearings on or before the 20th day of each calendar month, including the hearing held at Austin, Texas, on July 18, 1935, with respect to the existence and imminence of waste of Sweet Natural gas in the State of Texas, and the prevention thereof, and

Whereas, the Engineering Department of the Railroad Commission of Texas made a detailed study of the various gas wells in the state of Texas, and in doing so tested each gas well in Texas for its daily producing capacity, its gravity, and its rock pressure, and this record was submitted to the Commission showing this information, and showing the producing capacity of each well in Texas, as expressed in cubic feet per day computed at a base pressure of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method, and

Whereas, maps were submitted as evidence, showing the pressures of the various gas wells in Texas, and these maps

were contoured according to fields which reflected the reservoir conditions of said fields, and

Whereas, said pressure maps reflected that the Panhandle field can be separated and divided into two (2) zones or fields without the creation of physical waste, and hereafter the Panhandle field, for proration purposes, shall be separated into the East Panhandle field and the West Panhandle field, and this point of division shall be a line which runs due north and south through the Panhandle field along the east line of Sections 8, 9 & 10 of Block 8, I & G N RR Survey, Gray County. This line extends southward through the [fol. 59] field and through the city of LeFors and changes its course southwestward to the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward approximately through the east side of Sections 3, 4, 5 & 6 straight southward through the remaining portion of the field. This line passes through the east line of Sections 2 and 3, Block "H", A. Wallace Survey, all in Gray County. Hereafter, until further notified, this line shall separate, for proration purposes, the East and West Panhandle gas fields, and

Whereas, the Commission finds from a study by its Engineers and from evidence submitted to it at its hearing held in Austin, Texas, on July 18, 1935, that there are only approximately twelve (12) wells which are situated on acreage exceeding 640 acres, which represents approximately 1.5% of all wells in the Panhandle field, and

Whereas, it was testified by experts familiar with the conditions in the Panhandle field that the closer you drill wells together the more gas you will produce ultimately from the reservoir after the field has been depleted to its abandonment pressure."

That at said hearing it was developed that waste was taking place in the Panhandle Gas field of Texas, and that further waste was imminent, and the Railroad Commission of Texas, pursuant to the plain provisions and terms of said act, issued notice and conducted said hearing and developed said record, and found as recited in the above fact findings that it was necessary to issue said order to carry out the legislative mandate contained in said act, and to prevent the waste of the natural resources of the State.

That on August 1, 1935, the Railroad Commission of Texas amended said order above referred to, and on August 5, 1935, amended the order of July 20, 1935, and the order of August 1, 1935, and by such amendment readopted and repromulgated in its entirety the order above referred to, and in addition thereto found the following facts, which [fol. 60] appear in the face of said order, to wit:

"Whereas, pursuant to notice to all interested persons the Railroad Commission of Texas held a hearing at the Herring Hotel, Amarillo, Texas, on June 14, and 15, 1935, and at Austin, Texas, July 18 and 19, 1935, for the purpose of carrying out the requirements of House Bill 266, enacted by the Forty fourth Legislature at *his* regular session, after which hearings it promulgated an order dated August 1, 1935, fixing the allowable production of sweet natural gas in the Panhandle District of Texas, and it is the desire of the Railroad Commission to amend said order of August 1, 1935, so that it may make additional findings of fact which it was the intention of the Railroad Commission to set forth in said order of August 1, 1935:

Now, Therefore, it is Ordered that said order dated August 1, 1935, be and the same is hereby amended so that it shall hereafter read as follows:

From testimony introduced and witnesses heard at said hearings, the Commission makes the following findings of fact:

A. The purposes and intent of said House Bill 266 can be more effectively carried out by separating the Panhandle sweet gas field into two separate zones or two separate common reservoirs, one of which zones shall be known as the East Panhandle field. The point of division between said two fields shall be a line which runs due north and south through the Panhandle field along the east line of Sections 8, 9 and 10 of Block 3, I & G N RR Survey, Gray County. This line extends southward through the field and through the city of LeFors and changes its course southwestward to the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward approximately through the east side of Sections 3, 4, 5 and 6 straight southward through the remaining portion of the field. This line passes through the east line of Sections 2 and 3, Block "H", A. Wallace Survey, all in Gray County, Texas. The

Commission finds that these two zones should be established on account of the following facts:

A low pressure area exists in Gray County which forms a physical reservoir barrier between the two fields and makes the migration of gas impossible from either of said fields to the other. In addition to this reservoir condition, the pipe lines which withdraw gas from one of said fields do not now withdraw and have never withdrawn gas from the other of said fields and the lines of such companies do not extend into such other field.

[fol. 61] B. The aggregate lawful volume of open flow or daily potential capacity to produce sweet gas from both the West Panhandle sweet gas field and the East Panhandle sweet gas field is in excess of the daily reasonable market demand for such gas from such fields to be utilized for lawful purposes.

C. It is necessary to restrict the production of gas from wells capable of producing sweet gas, from each of said fields, to comply with the requirements of said House Bill 266. Physical waste, underground and overground, is now taking place in each of said fields; and the restriction of production when ratably distributed among the various wells in said fields, capable of producing sweet gas, will prevent physical waste as defined by said House Bill 266; will result in a greater ultimate recovery of gas from each of said fields; will result in a more efficient drainage from said reservoirs by the producing wells; and such restriction is necessary to protect and adjust the correlative rights and opportunities of the owners of the various wells in said fields capable of producing sweet gas.

D. The efficient drainage area of a gas well in the East Panhandle field, producing at 25% of the daily producing capacity, is 160 acres. Acreage surrounding any well in excess of that amount, therefore, should not be taken into account in allocating the allowable production among the various wells located in said field.

The evidence introduced at the hearings did not satisfy the Commission that wells located in the West Panhandle field, as described in Paragraph A above, have an efficient drainage area substantially different from those located in the East Panhandle field. The Commission does find, however, that on account of the lack of diverse fee and lease

ownerships in said West Panhandle field and the widely spaced drilling program which has been followed in said field, it is equitable under present conditions to fix an acreage factor to be used in allocating allowable production among wells in said West Panhandle field substantially larger than that which is fixed for the East Panhandle field, and that no substantial inequities and injustices to operators in either of said fields will be occasioned by such an acreage factor being adopted for the West Panhandle field. For this reason, therefore, the Commission finds that the efficient drainage area of a gas well located in the West Panhandle field, under present conditions, is 640 acres.

E. To accomplish the purposes set forth in Paragraph C hereof, the total production of all wells in each of said fields should be restricted to the reasonable market demand for lawful purposes for such gas from each of said fields, as found by the Commission.

[fol. 62] For the month of August, 1935, or until otherwise ordered, the reasonable market demand for sweet gas for lawful purposes from the East Panhandle field is found to be 88,407,000 cubic feet per day, computed at a pressure base of four ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method.

The reasonable market demand for sweet gas for lawful purposes from the West Panhandle field until otherwise ordered is found to be 482,143,000 cubic feet of gas per day, computed on the basis set forth in the preceding paragraph.

That the above fact findings contained in the fact of the new order dated August 5, 1935, represent a digest of the record made before said Commission at the various hearings conducted before it for the purpose of promulgating said order, and the various facts above alleged and contained in the face of said order were found and determined by the Commission at such hearings; and it was found, as recited in said order, that a necessity existed for the promulgation of such order, and that waste was occurring or was imminent, and in order to prevent the same and to protect the correlative property rights of the owners of said common

pool of gas that such order was necessary and pursuant to the provisions of said legislative act.

Respondents deny paragraphs (b), (c), (d), (e) and (f) in their entirety contained in paragraph twenty of said bill of complaint.

In this connection respondents say that said orders above referred to and described are necessary to prevent waste and protect the correlative property rights of the owners of said common pool, and that it is necessary to prorate said wells producing in said field and to fix an allowable [fol. 63] therefor in order to prevent waste by permitting said gas to be produced in excess of the market demand therefor, and to strip the gasoline content therefrom and permit the tail or residue gas to be blown into the air and thereby wasted. On the other hand, it is necessary to prorate said field and fix an allowable for each well producing therein in addition to the prevention of physical waste, for the purpose of protecting the rights of and affording an opportunity to each owner of said pool. That every producer of gas in said field is entitled to a pro rata part thereof, and the only way that this can be guaranteed and vouchsafed unto him is to prorate said field and fix an allowable for each well. To do otherwise would permit undue drainage and the taking of one owners gas by another owner to the former's detriment and loss.

The Commission did not act arbitrarily or capriciously in zoning said field in what was known as the East Panhandle field and the West Panhandle field, in that there exists between said two areas or zones a low pressure area from which no gas can be or is produced, and across said low pressure area gas cannot migrate from the East field into the West field. Conditions are different in the East field from those that exist in the West field. There is a considerable density of wells producing from the East field; and this condition does not exist in the West field. No gas is withdrawn from the West field by those pipe lines serving light and fuel markets in the East field, and no gas is withdrawn from the West field by those pipe lines transporting gas from the East field to the light and fuel market. Because of these conditions the Commission found that it was necessary to zone said Panhandle field. The provisions of H. B. 266 enacted by the 44th Legislature at its

Regular Session provided that the Commission could, if it [fol. 64] so determined after an investigation had been had thereon, zone said Panhandle reservoir into two or more zones. The Railroad Commission of Texas after proper notice had been given, and a hearing had been had, at which hearing evidence was introduced and testimony of witnesses heard which demonstrated and conclusively showed the necessity of the zoning of said field, which said zoning was done by the provisions of said order.

21

In answer to paragraph twenty-one of complainant's bill of complaint, wherein it is alleged that the Railroad Commission pursuant to the provisions of said act and said order tested two of complainant's wells, being the wells located upon the Texorado Oil and Gas Company lease covering the north one-half of the South 160 acres of Section 83, Block 46, H. & T. C. RR. Company Survey, Hutchinson County, Texas, and found said wells to contain more than 1½ grains of hydrogen sulphide per one hundred cubic feet of gas and classified said two wells as sour gas wells, whereas said two wells were in fact sweet gas wells and contained less than 1½ grains of hydrogen sulphide per one hundred cubic feet of gas. These respondents say that said two wells were retested and it was found that the gas produced therefrom contained less than 1½ grains of hydrogen sulphide per one hundred cubic feet of gas, and the Commission has reclassified said two wells as sweet gas wells.

22

Respondents deny in its entirety paragraph twenty-two of said bill of complaint.

[fol. 65]

23

Respondents deny those allegations contained in paragraph twenty-three of said bill of complaint wherein it is alleged that H. B. 266 enacted by the 44th Legislature of Texas and the Railroad Commission order dated July 20, 1935, promulgated by such Commission pursuant to said act, are void and unconstitutional for the various reasons assigned by complainant in its said bill of complaint; and on the contrary allege that said act of the Legislature is a

valid and constitutional act, and that the order promulgated by the Commission dated July 20, 1935, and as amended August 2, 1935, and as amended August 5, 1935, are valid and constitutional orders and are applicable to this complainant, and under the provisions of same it is required to abide by the provisions thereof.

Respondents deny, as alleged by complainant in paragraph twenty-three of said bill, that they are threatening to enforce the provisions of said act and of said order against this complainant; but in this connection say that said act and said orders are valid and constitutional laws of the State and orders of the Commission and applies to this complainant, and all others similarly situated, and if complainant violates the provisions thereof or does not comply with the terms of said orders and of said law, then and in that event these respondents will proceed in the enforcement thereof; but if this complainant complies with the provisions of said act and with the provisions of said order it will not be molested nor disturbed; but if it violates the same it will then become the duty of these respondents to enforce the provisions thereof as against it, and all others similarly situated.

[fol. 66] 24

Respondents deny those allegations contained in paragraph twenty-four of said bill of complaint wherein it is alleged that if said act of the Legislature and order of the Commission be enforced against it and its property it will be denied the use of said property and the right to take gas therefrom in the same proportion that sour gas owners are permitted by said act to produce and process the same in its gasoline manufacturing plant, and it will lose in excess of $800.00 per day, and that a major portion of its said plant will be required to be shut down; but on the contrary allege the facts to be that all producers of sour gas in said area under the provisions of said act may continue to produce the same in the same amounts that they have heretofore produced until October 1, 1935, and that no order of the Railroad Commission of Texas had been promulgated and will not be promulgated until October 1, 1935, attempting to prorate and put an allowable on those wells producing sour gas in said area; and that all those wells producing sweet gas in said area since August 1, 1935, under the

provisions of said act and of said orders of the Commission, have been prorated and put on allowables, and each is entitled to produce its respective allowable in accordance with the provisions of said orders, and in doing so no drainage will occur and each producer and operator will secure his same share of gas underlying his land and his rights in said reservoir will be protected and safeguarded and physical waste will be prevented thereby. These respondents also say that no part of the complainant's plant will be closed down by virtue of said orders dated July 20, 1935, August 1, 1935, and August 5, 1935, for the reason that this [fols. 67-71] complainant has eight wells producing sour gas, from which eight wells it can produce sufficient gas to supply its said carbon black plant and operate the same at full capacity. That there is no law nor order at this time prohibiting the producing of said wells in a sufficient amount to supply its said plant in order that said plant may operate at full capacity.

Wherefore, respondents pray that no injunctive relief be granted herein, and that complainant take nothing by this suit, and that said complaint be dismissed, and that respondents be discharged.

(Signed) Wm. McCraw, Attorney General of Texas;
(Signed) Archie D. Gray, Assistant Attorney General, Attorneys for Respondents.

[fol. 72] In United States District Court

[Title omitted]

Complainant's Amended Bill of Complaint—Filed August 30, 1935

To the Honorable Said Court:

Now comes The Henderson Company, a corporation, complainant herein, and with leave of the Court had and obtained, amends its Bill of Complaint herein field, by striking Paragraph XX and substituting in lieu thereof, the following:

XX

That the provisions of said act, insofar as they differentiate between sweet and sour gas and prohibit the use of

sweet gas in the manufacture of carbon black, and declare that the use of sweet gas in the manufacture of carbon black shall constitute waste, and said orders of the Railroad Commission promulgated thereunder, are unconstitutional and void in their application to complainant and its said properties, in this:

(a) That said Panhandle gas field is underlaid by one common gas reservoir; that there is no structural barrier between the sweet and sour gas areas; that there is a lower pressure condition obtaining in the sour gas area than in the sweet area, and as a result of which sweet gas is constantly migrating into the sour gas area, diluting the sour gas and constantly diminishing and constricting the sour [fol. 73] gas area; that complainant's properties originally laid well within the sour gas area, but due to this migration of the sweet gas into the sour, the very border line now transverses the properties of complainant; that the remaining seven wells connected with complainant's plant, and classified by the Railroad Commission as sour gas wells, even though permitted to produce at 25 per cent of their open flow, will be unable to produce sufficient gas to fulfill the requirements of the Combined Carbon Company, which complainant is under contract to deliver, and to furnish fuel for the operation of complainant's plant and properties. That complainant's requirements for such purposes would be approximately 7,000,000 cubic feet over and above what said seven wells can produce on the basis of 25 per cent of their open flow; that in a short time, by reason of such migration of sweet gas into the sour area, said remaining seven wells will become sweet under such classification as contained in said act, and complainant will not be permitted to produce any gas from its said properties now owned by it and covered by said casinghead gas contracts. In this connection, complainant avers that there are no other unconnected sour gas wells in the Sanford territory or within any reasonable distance to complainant's said plant, to which complainant can make connection and purchase the gas therefrom, and complainant cannot obtain gas from any other source than from the wells with which it is now connected and has under contract for its carbon black requirements, except at prohibitive cost, and if the provisions of said act herein complained of, and said orders of the Railroad Commission be enforced against it, your

complainant will lose its entire investment, including its carbon black contract with the Combined Carbon Company.

[fol. 74] XX-a

Complainant further represents to the Court that said order of the Railroad Commission, dated July 20, 1935, as herein set out, as amended August 1, and August 5, 1935, in the manner as set out in defendants' answer filed herein, is invalid and void, for all of the reasons hereinabove assigned, as to the invalidity of said provisions of the act herein complained of, and that in addition thereto, the order is further invalid and void, for the following reasons:

(a) That said order shows upon its face that the Commission did not take into consideration any wells or gas capable of being produced therefrom, located in the sour gas area of the Panhandle field, in arriving at the total market demand and the total allowable production.

(b) That said order nowhere provides for the allocation of wells, heretofore unconnected, to the various markets for which said wells are permitted to produce, does not provide for connection, nor direct who shall make the connection, and nowhere determines what is a fair price for such gas, as required by said act.

(c) That as a matter of fact, no fact justification exists in the Panhandle field for the promulgation of such order prorating and limiting the production of gas under subdivision (a) contained in Section 10 of said act, for the reason that gas, unlike oil, cannot be stored and must be marketed as produced, and other provisions of said act prohibit the wastage of such gas into the air, and the performance of other acts constituting waste as therein defined, and as a matter of fact gas cannot be produced beyond the market requirements and facilities therefor, so as to constitute waste.

(d) That said Sections 10 and 11 of said act, under authority of which said proration order was issued, are void and unconstitutional, in this:

[fol. 75] (1) That said provisions are unreasonable and arbitrary, for which there is no basis in fact; that as a matter of fact limitation or proration of production could

not lessen or prevent waste, for gas, unlike oil, must be utilized as produced and said act elsewhere in its provisions presents the wastage of said gas into the air and otherwise in the operation and utilization of the same, and said act nowhere attempts to define that unequal withdrawals in the same reservoir constitute waste, and if it did, there would be no basis of fact therefor.

(2) That said provisions of said act are no more than an attempt to force ratable purchase or ratable take on the part of those who, through their own efforts, have acquired and established their own market, and to force those with markets to share the same with others who have no market, and the enforcement of the provisions of said act therefore would be violative of Section 10, Article I, and the Fourteenth Amendment of the Constitution of the United States, and Sections 16 and 19 of the Constitution of Texas.

(3) That said sections of said act are in conflict with and violative of Section 7, Article 14 of the Constitution of Texas and the rule of property in this state.

(e) That said order of said Railroad Commission is further void, in that it divides the Panhandle field into two zones, without fact justification therefor, and authorizes different allowables in the two zones, which provisions of said order is based on Section 19 of said act, which section of said act is invalid for the reason that it lays down no rule or yardstick which shall govern the Commission in attempting to create different zones in a common reservoir.

Wherefore, complainant prays for the relief sought and prayed for in its Original Bill of Complaint and for the annullment of the particular orders and rules of the Rail-
[fol. 76] road Commission specifically enumerated and referred to in its amendment, in addition to those under attack in the Original Bill of Complaint, and for such other and further relief in equity to which it may show itself entitled in the premises.

(Signed) F. W. Fischer, L. M. Fischer, Attorneys for Complainant.

Duly sworn to by F. C. Hall. Jurat omitted in printing.

[File endorsement omitted.]

[fol. 77] IN UNITED STATES DISTRICT COURT

[Title omitted]

ORDER GRANTING MOTION FOR LEAVE TO FILE AMENDMENT TO BILL OF COMPLAINT—Filed February 28, 1936

Now, on this 28th day of February, 1936, came on to be heard, by the Statutory Three-Judge Court heretofore constituted in the above entitled and numbered cause, complainant's motion to file an amendment to its original bill of complaint, as submitted with said motion; and, it appearing to the Court that said motion should be granted,

It is, Therefore, Ordered, Adjudged and Decreed, that complainant be, and it is hereby granted leave to file such amendment to its original bill of complaint heretofore filed herein.

(Signed) J. C. Hutcheson, Jr., Judge Fifth Circuit. (Signed) T. M. Kennerly, Judge Southern District of Texas. (Signed) Robert J. McMillan, Judge Western District of Texas.

[File endorsement omitted.]

[fol. 78] IN UNITED STATES DISTRICT COURT

[Title omitted]

AMENDMENT TO BILL OF COMPLAINT—Filed February 28, 1936

To Said Honorable Court:

Now comes The Henderson Company, a corporation, complainant herein, and with leave of the Court had and obtained, amends its Bill of Complaint as originally filed herein and as heretofore amended, by adding, after Paragraph XXIII of the original Bill of Complaint and immediately before the prayer thereof, the following:

XXIV

That since the filing of said original Bill of Complaint, the order of the Railroad Commission dated July 20, 1935, as therein complained of, was amended on August 1, 1935

and again amended on August 5, 1935, in the manner as set out in the defendants' answer filed herein; that since said time, and under the purported authority of said act, the defendants, composing the Railroad Commission of Texas, from time to time have promulgated and issued new orders and schedules of the same purpose and import as those above referred to, restricting the use of sweet gas produced in the Panhandle field of Texas to the uses set out in said act, and prescribing the amount that each producer shall be allowed to produce from his wells. The only change in such subsequent orders from those above mentioned being the amount of allowable gas permitted to be produced from each well. That on December 10, 1935, the defendants, constituting the Railroad Commission of Texas, [fol. 79] promulgated a new order, denominated "Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas", and in connection with said order caused to be issued certain schedules prescribing the amount of allowable production from the gas wells located in the Panhandle of Texas, effective for the balance of said month of December, 1935, and for the month of January, 1936. Said order was purported to have been issued in pursuance of a hearing held by said defendants on November 19, 1935, which order contains the following provision: "That the use of sweet gas produced from a gas well for the manufacture of carbon black shall in no case be permitted." On January 18, 1936, the defendants, composing the Railroad Commission, promulgated and issued a new order, known as "Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle of Texas for the Month of February, 1936", which order, together with the one issued on December 10, 1935, as above mentioned, are of similar import and character to all of such orders theretofore issued by said defendants with reference to the production and utilization of gas from the Panhandle field of Texas, but in said order of January 18, 1936, said defendants referred to their order of December 10, 1935, and denominated it as the basic order for all future orders of said defendants promulgated in pursuance to said act relative to the Panhandle gas field. That in pursuance to the order of said defendants issued January 18, 1936, certain schedules fixing the allowable production from sweet and

sour gas wells for the Panhandle District were issued effective February 1, 1936.

That under the order of December 10, 1935, and the schedules issued in pursuance thereof, effective for the balance of said month of December, 1935, the complainant was authorized and allowed to produce from its fourteen wells [fol. 80] hereinbefore described, so classified by the defendants composing the Railroad Commission as sweet gas wells, a total of 8,744,000 cubic feet per day, and was permitted to produce from its remaining seven wells, classified by said defendants as sour gas wells, a total of 13,415,000 cubic feet per day; that under the schedules issued by said defendants composing the Commission, in pursuance to said order of December 10, 1935, but effective January 1, 1936 and continuing for said month of January, 1936, the complainant was allowed and permitted to produce from its said fourteen sweet wells the total amount of — cubic feet per day, and from its seven sour wells a total amount of 28,366,000 cubic feet per day. That under the schedule issued in pursuance to the order of January 18, 1936, effective for the month of February, 1936, complainant was allowed to produce from its fourteen sweet wells 8,581,000 cubic feet per day and from its seven sour wells, 9,922,000 cubic feet per day.

For the month of January, under said orders of the Commission, complainant was authorized and allowed to produce from its sour gas wells approximately 23 per cent of their total open flow capacity. Under the order issued by the Commission for the month of February, complainant's allowable from its sour gas wells was reduced from 28,000,000 cubic feet, allowed the previous month, to 9,000,000 cubic feet, or approximately 8 per cent of the total open flow capacity of its said wells. This action on behalf of the defendants, constituting the Commission, is attempted to be justified in its order dated January 18, 1936, under Subdivision Fifth thereof, wherein it is stated that "It is necessary to limit the production of dry sour natural gas to 15 per cent of the total potential of the sour gas area". But, the schedule issued by said defendants in pursuance to said order does not allow complainant to produce 15 per cent [fol. 81] of its open flow capacity, whereas it permits approximately seventy-five other wells of the same classifica-

tion to produce approximately 25 per cent of their open flow capacity.

XXV

That the provisions of said act, insofar as they differentiate betweem sweet and sour gas and prohibit the use of sweet gas in the manufacture of carbon black and declare that the use of sweet gas in the manufacture of carbon black shall constitute waste, and said orders of the Railroad Commission promulgated thereunder, are unconstitutional and void in their application to complainant and its said properties, in this:

(a) That said Panhandle field is underlaid by one common gas reservior; that there is no structural barrier between the sweet and sour areas; that there is a lower pressure prevailing in the sour gas area than in the sweet gas area, and as a result of which, sweet gas is constantly migrating into the sour area, diluting the sour gas and constantly diminishing and constricting the sour gas area; that complainant's properties originally laid well within the sour area, but due to this migration of sweet gas into the sour, the very border line, as defined by said act, now transverses the properties of the complainant; that the remaining seven wells connected with complainant's plant and classified by the Commission as sour gas wells, which under the Commission's order effective for the month of February are allowed to produce only the total amount of 9,922,000 cubic feet per day, will be unable to produce sufficient gas to fulfill the requirements of the Combined Carbon Company with which complainant is under contract to deliver, and to furnish fuel for the operation of complainant's plant and properties; that even if complainant were permitted to produce from its said sour wells at a rate of [fol. 82] 25 per cent of their open flow capacity, which is the maximum amount of gas production allowed by said act, complainant's carbon black and fuel requirements would be approximately 10,000,000 cubic feet over and above what its sour wells could produce on such basis of 25 per cent of their open flow; that in a short time, by reason of such migration of sweet gas into the sour area, said seven remaining wells will become sweet under such classification as contained in said act, and if said act be enforced

against complainant it will not be permitted to produce any gas from any of its said properties now owned by it and covered by said casinghead gas contracts. In this connection, complainant avers that there are no other unconnected sour gas wells in the Sanford territory or within reasonable distance to complainant's said plant to which complainant can make connection and utilize the gas therefrom in its said gasoline plant and the residue for carbon black manufacture, and complainant cannot obtain gas for its carbon black and fuel requirements from any other source than from the wells with which it is now connected and has under contract, except at a prohibitive cost and expense, amounting to several hundred thousands of dollars, and if the provisions of said act herein complained of and said orders of the Commission be enforced, complainant will lose its gas contracts covering the wells and properties hereinbefore described, and in addition thereto it will lose its carbon black contract with the Combined Carbon Company and will be forced to close down its plant with resultant deterioration, and will lose its entire investment. That the complainant, in truth and in fact, in its operation and the utilization of gas from its said properties for its carbon black and fuel requirements, is not creating or causing any physical waste of gas; that it is conducting a useful and legitimate business and that it, as well as Combined Carbon Company, is manufacturing useful, needful [fol. 83] and necessary products, and the enforcement of the provisions of said act and orders against it and its properties would be violative of the Fourteenth Amendment to the Federal Constitution and Section 16, Article 1, of the Constitution of Texas.

(b) That if the provisions of said act and orders of the Commission be enforced against complainant and its said properties, the same will amount to an unreasonable and arbitrary discrimination between complainant and others similarly situated and in the same class, in this: that complainant does not now have, and neither can it obtain in the future, any reasonable market for the gas produced from said wells classified by the Commission as sweet, for light and fuel purposes; that there now prevails in the sour gas area, immediately adjacent to the properties of complainant, upon which said fourteen wells so classifield as sweet are located, a lower pressure condition than that of said

wells of complainant, and as a result thereof gas underneath complainant's properties is migrating to and is being drained by the adjacent sour gas wells, which, under said act and orders of the Commission, are allowed to produce and utilize such gas in the manufacture of carbon black; that in addition to this, said act authorizes the sour gas area to produce to the extent of its carbon black requirements, whereas it limits the sweet area to produce only to its light and fuel requirements; that as a result of the authorization of said act and the orders of the Commission thereunder, the sour area is producing, in relation to its total open flow, from two to three times as much as the sweet area, with the result that complainant's gas so classified by the Commission as sweet is now being drained by the adjacent sour wells and there produced through such wells and utilized in the manufacture of carbon black, and thus complainant, under the provisions of said act and [fol. 84] orders, is denied the right to produce its gas and utilize the same in carbon black manufacture, whereas complainant's neighbor in the same character of business and in the same class is permitted to drain and take complainant's gas and utilize it for carbon black. Thus, the provisions of said act and the orders of the Commission, as applied to complainant and its properties, is unreasonably discriminatory and void.

(c) That the provisions of said act herein complained of, and the orders of the Commission promulgated thereunder, are particularly unconstitutional and void as applied to complainant and its properties, as being in violation of Section 16, Article 1 of the Constitution of Texas, in this: as hereinabove set forth, the necessary effect of the provisions of said act and order, if enforced against complainant and its properties, will absolutely impair and destroy complainant's said contract with Combined Carbon Company, which is of the value to complainant in excess of $250,000.00, and will impair and destroy complainant's gas contracts covering said wells and properties above described, which are of the value to complainant of many thousands of dollars; that each of said contracts was lawfully made prior to the passage of said act, and under said provision of the Constitution of Texas the Legislature of Texas is powerless to pass any law, the effect of which is to impair the obligation of preexisting contracts,

and in this connection complainant says that said Section 16, Article 1 of the Constitution of Texas is included in and is a part of the Bill of Rights, and that the provisions of the Bill of Rights are expressly carved and excepted out of the general powers of government, and the police power as well as Section 59a, Article 16, are subordinate and inferior to the rights guaranteed complainant under said Section 16, Article 1 of the Constitution of Texas, and the [fol. 85] Legislature is not authorized, acting either under its police power or under Section 59a, Article 16 of the Texas Constitution, to enact any law, the effect of which is to impair the obligation of contracts, irrespective of the purposes of said act or the reasonableness thereof.

(d) The provisions of said act, and the orders of the Commission herein complained of, are further unconstitutional and void in that their enforcement arbitrarily and unreasonably discriminates between manufacturers of carbon black and the manufacturers of other products, in this: said act authorizes the use of sweet gas for fuel purposes and there is no limitation nor restriction upon the user of sweet gas for such purposes, as to the volume, quality or value of the product manufactured. Any person desiring to manufacture a product requiring in its manufacture the application of heat is authorized, under said act, to use sweet gas in unlimited quantities, irrespective of the amount, the quality, the utility or usefulness, or the volume of such product. In the manufacture of carbon black the heat units contained in the gas from which the carbon black is manufactured are absolutely applied and utilized for the purpose of breaking down and separating the hydro-carbons contained in such gas, and without the application of heat or the utilization of the heat units contained in gas for fuel purposes, in order to generate heat, no carbon black products can be manufactured. Thus, carbon black manufacturers utilize the gas for fuel purposes as well as for the production of carbon black, but said act singles carbon black manufacturers out and prohibits them from utilizing sweet gas for the manufacture of carbon black, although such gas in such manufacture is actually used for fuel purposes.

XXVI

Complainant further says that said orders of the Commission, complained of herein, and all other orders which

[fol. 86] may be hereafter issued or promulgated by the defendants, composing the Railroad Commission, in pursuance to the provisions of said act complained of herein, are invalid and void for all of the reasons hereinabove assigned as to the invalidity of the provisions of said act complained of, and in addition thereto, said orders are further unconstitutional and void, as applied to complainant and its said properties, for the following reasons:

(a) That said orders have no reasonable relation to the prevention of physical waste of gas in the Panhandle field, and particularly as applied to complainant's properties, for the reason that the complainant, in the operation of its said properties and the production of gas therefrom for the purpose of extracting the gasoline content therein in its gasoline plant and delivering the residue thereof to Combined Carbon Company, is not creating any actual physical waste of gas.

(b) That the purported fact findings upon the part of the Commission, as contained in said orders to the effect that physical waste, both underground and overground is now taking place in the Panhandle field, and that the restriction of production when ratably distributed, will prevent such waste, are nothing more than conclusions on the part of said defendants, composing the Commission, and that no evidence of any probative force has been introduced before the Commission warranting or justifying any such conclusion of fact, and no substantial testimony was introduced before the Commission, in any of its hearings pertaining to the Panhandle gas field, to the effect that the restriction of production when ratably distributed among the various wells in the Panhandle capable of producing sweet or sour gas will prevent physical waste as defined in said act, or will result in a greater ultimate recovery of gas from each of said fields, or will result in a more efficient drainage from said reservoir by the producing wells. That there is no basis of fact for such conclusion [fol. 87] on the part of said defendants, and the same is purely arbitrary and ostensibly made for the purpose of attempting to bolster up the orders hereunder attacked.

(c) That said order nowhere provides for the allocation of wells, heretofore unconnected, to the various markets for which said wells are permitted to produce, does not

provide for connection, nor direct who shall make the connection, and nowhere determines what is a fair price for such gas, as required by said act.

(d) That as a matter of fact, no fact justification exists in the Panhandle field for the promulgation of such order prorating and limiting the production of gas under subdivision (a) contained in Section 10 of said act, for the reason that gas, unlike oil, cannot be stored and must be marketed as produced, and other provisions of said act prohibit the wastage of such gas into the air, and the performance of other acts constituting waste as therein defined, and as a matter of fact gas cannot be produced beyond the market requirements and facilities therefor, so as to constitute waste.

(e) That said Sections 10 and 11 of said act, under authority of which said proration order was issued, are void and unconstitutional, in this:

(1) That said provisions are unreasonably arbitrary for which there is no basis in fact; that as a matter of fact limitation or proration of production could not lessen or prevent waste, for gas, unlike oil, must be utilized as produced, and said act elsewhere in its provisions, prevents the wastage of said gas into the air and otherwise in the operation and utilization of the same, and said act nowhere attempts to define that unequal withdrawals in the same reservoir constitute waste, and if it did, there would be no basis of fact therefor.

[fol. 88] (2) That said provisions of said act are no more than an attempt to force ratable purchase or ratable take on the part of those who, through their own efforts, have acquired and established their own market, and to force those with markets to share the same with others who have no market, and the enforcement of the provisions of said act therefore would be violative of Section 10, Article 1, and the Fourteenth Amendment of the Constitution of the United States, and Sections 16 and 19 of the Constitution of Texas.

(3) That said sections of said act are in conflict with and violative of Section 7, Article 14 of the Constitution of Texas and the rule of property in this state.

(f) That said order of said Commission is further void, in that it divides the Panhandle field into two zones, without fact justification therefor, and authorizes different allowables in the two zones, which provisions of said order are based on Section 19 of said act, which section is invalid for the reason that it lays down no rule or yardstick which shall govern the Commission in attempting to create different zones in a common reservoir.

(g) The provisions of Section 10 of said act, under which said Commission purported to act in promulgating said order, does not authorize nor empower the defendants, composing the Commission, to make any order restricting the production of gas in the Panhandle field, and particularly the gas capable of being produced from complainant's wells, above described, on the theory of protecting correlative rights of the owners of wells in the Panhandle field, for the reason that said act has not changed the rule of property in Texas, and if it attempted to do so, it would be unconstitutional and void, for the reason that the Constitution of Texas invested the owners of the surface with title to the oil and gas under their land, and the Legislature is powerless to divest them of their property and property [fol. 89] rights, and in lieu thereof to give them some indeterminate interest in a common pool or general reservoir, to the extent that the defendants composing the Commission—an everchanging administrative board—might, through whim or fancy, determine as the occasion arose.

(h) There is no provision in the Constitution of Texas whereby the Railroad Commission, an executive board, and the members thereof, who are executive officers of the State, may exercise any character of judicial or legislative function. In this connection, complainant shows that the only power and authority conferred on the Railroad Commission by the Constitution of Texas are executive in character and not legislative or judicial, and the Legislature of Texas is without authority to confer upon the Railroad Commission any judicial function or legislative power. Said act, in defining the duties of the Commission in connection with its enforcement, purports to confer upon the Commission power and authority both legislative and judicial in character; and the defendants, composing the

Railroad Commission, in the promulgation of the orders of which complaint is made herein, seek to exercise powers which are in some aspects thereof purely judicial and in other respects purely legislative, in this:

(1) The Railroad Commission is directed by such act to inquire into the production and reasonable market demand therefor, and to determine the allowable production from such common source of supply, which shall be the reasonable market demand which can be produced without waste. Such provision of said act is an attempt by the Legislature to confer upon the Railroad Commission legislative power to ascertain the reasonable market demand which necessarily involves consideration of price, and to determine the allowable production from the common source of supply without prescribing the standard by which the market de- [fol. 90] mand and the allowable production shall be determined, which power the Legislature is without authority to delegate to the Railroad Commission.

(2) Said act requires the Railroad Commission to allocate, distribute and apportion the allowable production from the common source of supply among the various producers on a reasonable basis, and to limit the production of each producer to the amount allocated or apportioned to such producer. Said act also provides for a hearing, after due notice, at which hearing evidence shall be heard upon which it shall base such allocation, distribution or apportionment. By such provision the Legislature purported to confer on the Railroad Commission functions that are purely judicial, in that the allocation, distribution or apportionment of the production from the common source of supply, common pool, or portion thereof, among the producers upon a reasonable basis necessarily involved an examination into the legal rights and the extent of the property rights of each producer in the common source of supply, common pool, or portion thereof, which examinations are of a purely judicial character.

(3) Said act, particularly Section 10 thereof, directs the Railroad Commission to prorate and regulate production of natural gas for the protection of public and private interests in the prevention of waste, as waste is defined in the act, and in the adjustment of correlative rights and opportunities of each owner of gas in a common reservoir to

produce and use or sell such gas as permitted in the act. Nowhere in said act is the term "correlative rights and opportunities" defined, and nowhere in said act is any standard set up by which the Railroad Commission is to ascertain the correlative rights and opportunities of the owners of natural gas in a common reservoir to produce and use such gas. This requirement, in the light of the context [fol. 91] of the act, places in the Railroad Commission the full power and authority to determine for itself what are the correlative rights and opportunities of the owners of gas in a common reservoir to produce, use and sell the same. If said act operates as an attempt by the Legislature to modify or change the property rights of the owner in a gas well as declared by the courts of last resort of the State of Texas, as hereinabove set forth, then the term "correlative rights and opportunities" has no such definite, fixed and known meaning as to be a matter of common knowledge, and in any effort to carry out such requirement of said act the Railroad Commission is necessarily performing both a legislative function in determining what are the correlative rights and opportunities of such owners of gas wells in a common reservoir, and a judicial function in attempting to adjust such correlative rights and opportunities after having determined the same. Such provision of the act is an attempt by the Legislature to confer upon the Railroad Commission, an executive administrative body or board, legislative and judicial powers prohibited under the express terms of the Constitution of Texas and are *therefore null and void.*

(4) Such order of the Commission, insofar as it purports to fix and establish the allowable production and the reasonable market demand therefor, constitutes an effort on the part of the Railroad Commission illegally to exercise legislative power which the Legislature was without authority to delegate to the Railroad Commission, and the same is therefore void and unenforcible as to complainant.

(5) Such order, insofar as it purports to allocate, distribute and apportion the allowable production from the common source of supply among the various producers on a [fol. 92] socalled reasonable basis, and insofar as it undertakes to limit the production of each producer to the amount allocated to such producer, is void and unenfore-

ible as against complainant for the reason that it constitutes an effort on the part of said Commission to exercise functions purely judicial in character, in violation of the constitutional provisions above referred to.

(6) The order hereinabove referred to, insofar as it purports to determine and declare the correlative rights and opportunities of each owner of gas in a common reservoir to produce gas and sell such gas as permitted under the terms of the article, is void and unenforcible as against complainant for the reason that it constitutes an effort on the part of said Commission to exercise functions purely legislative in character, in violation of the constitutional provisions above referred to.

(7) Such order, insofar as it purports to adjust such correlative rights and opportunities of owners of gas in a common reservoir to produce, use and sell such gas as permitted under the terms of the act, is void and unenforcible as against complainant for the reason that it constitutes an effort on the part of the Commission to exercise functions purely judicial in character, in violation of the constitutional provisions above referred to.

Wherefore, complainant prays for the relief sought and prayed for in its original Bill of Complaint, and for the annulment of the particular orders and rules of the Railroad Commission specifically enumerated and referred to in this amendment, in addition to those under attack in the original Bill of Complaint, and for such other and further relief in equity, to which it may show itself entitled in the premises.

(Signed) L. M. Fischer, F. W. Fischer, Attorneys for Complainant

[fol. 93] *Duly sworn to by F. C. Hall. Jurat omitted in printing.*

[File endorsement omitted.]

[fol. 94] IN UNITED STATES DISTRICT COURT

[Title omitted]

RESPONDENTS' ANSWER TO AMENDMENT TO BILL OF COMPLAINT—Filed February 28, 1936

To the Honorable Court Aforesaid:

Now come the respondents in the above styled and numbered cause and file this their answer to the amendment to the bill of complaint filed by the complainant herein, which amendment adds after paragraph 23 of the original bill of complaint, and for such answer respectfully show and represent to the court as follows, to-wit:

1.

These respondents admit the allegations set out in paragraph twenty-four of said amendment wherein it is alleged that the action of the defendants in reducing the allowable of the sour gas wells belonging to the plaintiff herein is attempted to be justified by its order dated January 18, 1936; and in this connection say and show to the court that the schedules of allowables allotted to each well in the sour gas area was determined upon the allocation set out and prescribed in said order of January 18, 1936, and in accordance with the formula adopted of 50% allotted to the potential of each well and 50% to acreage based upon an [fol. 95] efficient drainage area of 640 acres in the West Panhandle field; that the provisions of said schedule allotting such allowables to the complainant herein were based upon such formula, that is, allowance of 50% to the potential and 50% to the acreage of said wells; that the complainant's wells are situated on very limited acreage and have in truth and in fact a very small drainage area, although there has been produced from said wells tremendous amounts of gas, such amounts exceeding the original gas in place under such acreage by many times. These respondents deny that 75 other wells of the same classification as complainant's are allowed to produce 25% of their open flow capacity; and in this connection say that all of the wells in the sour gas area were allotted an allowable production under the schedules promulgated by the Rail-

road Commission for the month of February, 1936, based upon the formula of 50% allotted to potential and 50% to acreage not exceeding an efficient drainage area which was set at 640 acres. That such other wells having allowables in excess of the allowables allotted to this complainant herein are wells having larger potentials with greater acreage surrounding them, and accordingly are permitted under House Bill 266 and the orders of the Commission promulgated in pursuance thereto, because producing larger amounts of gas than wells having smaller potentials with smaller acreage. That the enforcement of said act and orders will result in uniform withdrawals in accordance with the capacity of the wells to produce and the drainage area surounding said wells. That in truth and in fact the complainant has not complied with the schedules of allowables prescribed by the Railroad Commission for the month of February, 1936, nor has it in manner complied with the schedules of allowables prescribed by the Railroad Commission for the months of October, November, December, 1935, and January, 1936, but on the other hand has produced in excess of three times the allowables pre- [fol. 96] scribed by the Railroad Commission from its wells classified as sour gas wells and has during all of said period and is now producing from said wells classified as sour gas wells amounts of gas in excess of the requirements under its purported contract of sale to the Combined Carbon Company, and that said orders and schedules of allowables have in no manner affected the actual production from the sour gas wells owned and operated by the complainant, and complainant has never restricted itself to such allowables.

2.

These respondents deny the allegations set out in paragraph twenty-five of the amendment to the bill of complaint wherein it is alleged that the orders of the Commission and the provisions of House Bill are unconstitutional and void.

(a) These respondents admit that the Panhandle field is underlaid by one common gas reservoir and that there is no structural barrier between the sweet and sour gas areas; that there is in general a lower pressure prevailing in the sour gas areas than in the sweet gas areas; but in this con-

nection these respondents deny that as a result of such general differences of pressure gradients that there is any appreciable migration from the sweet gas area into the sour gas area; that a great portion of the sour gas area of the Panhandle field retains and has a pressure in excess of the pressure existing in portions of the sweet gas area of the field, and that whether migration actually exists as between said areas depends upon the particular locality through which the line differentiating between sweet and sour gas areas runs. That with respect to the situation of the wells operated by the complainant herein that by reason of the tremendous withdrawals of gas brought about through the operation of the wells of the complainant, which gas so produced was used in the stripping plant [fol. 97] operated by the complainant, residue gas being blown into the air, in excess of eighty million cubic feet of gas per acre were taken from the reservoir, whereas, there was only from sixteen to twenty-five million cubic feet of gas per acre originally in place. By operations of the complainant's wells there has been tremendous drainage brought from the sour and sweet gas areas onto and under the property where the wells of complainant are located, and a tremendous low pressure area was created, which low pressure area exists at this time, immediately surrounding the complainant's plant and wells, from which plant and wells higher pressure gradients extend outward into both the sweet and sour gas areas in the form of a rough circle. That no sweet gas can migrate from the regions of higher pressure across to properties of the complainant, a low pressure area, into the sour gas area, an area of higher pressure gradients. That, therefore, there is not and cannot be any appreciable drainage from the sweet to the sour gas area in the vicinity of the complainant's plant and wells, but that if any such drainage exists the same was brought about and is the direct result of voracious and unequal withdrawals of the complainant from said properties for use in his gasoline stripping plant from which the residue was blown into the air and forever wasted. These respondents deny that the necessary effect of the order of the Commission will be to change the classification of said wells from sour to sweet gas wells, or that the complainant cannot obtain gas for its carbon black and fuel requirements from any other source than from the

wells to which it is now connected and has under contract. These respondents deny that the complainant in the operation and utilization of gas from its said properties for carbon black and fuel requirements is not creating or causing any physical waste of gas, or that the enforcement of the provisions of House Bill 266 and the orders of the Commission would be violative of its rights under the 14th [fol. 98] Amendment to the federal Constitution and under the Constitution of the State of Texas. In this connection these respondents say that the utilization of sweet gas for carbon black purposes is a wasteful and destructive process; that the classification made by House Bill 266 as to sweet and sour gas is in all things reasonable and a just classification and that there is a substantial ground for such distinction and application of the uses of said two kinds of gas; that sweet gas as defined by said act is useable for light and fuel purposes, and that sour gas as defined by said act is not so useable; that the process of manufacturing carbon black is in truth and in fact a wasteful process, and while the recovery of carbon black per 1000 cubic feet of gas in the plant of Combined Carbon Company is only one and one half (1½) pounds, that there is from thirty-one (31) to thirty-five (35) pounds of carbon black in each 1000 cubic feet of natural gas; and that sour gas can be used for carbon black requirements as readily as sweet gas can be so used.

(b) These respondents deny the allegations set out in paragraph (b) of paragraph twenty-five of the amendment to the bill of complaint wherein it is alleged that the said act and the orders of the Commission will amount to an unreasonable and arbitrary discrimination between complainant and others similarly situated. In this connection these respondents say that there does now exist a market for the gas produced from the said wells classified by the Commission as sweet gas wells for the purposes for which sweet gas can be utilized under House Bill 266; that there is no appreciable migration of gas from the sweet to the sour gas area in the vicinity of the plant of the complainant; that with respect to the total reserve of sweet and sour gas in the Panhandle field the allotment of production to [fol. 99] said two areas is in approximately the same proportion as said reserves. These respondents deny that there is any appreciable migration of gas from the sweet

and sour gas areas, or that such migration will result in the unconstitutional taking of the complainant's property; that said act and orders of the Commission being within the police power of the State any minor inequalities resulting therefrom would in no manner destroy said act or said orders as a whole.

(c) These respondents deny the allegations set out in sub-paragraph (c) of paragraph twenty-five of the amendment to the bill of complaint. In this connection these respondents say that any such contracts entered into by the complainant with Combined Carbon Company were entered into in full recognition that the Legislature of the State of Texas could exercise as to such contract in the production of gas in said Panhandle field police power inherent in such body.

(d) These respondents deny the allegations set out in sub-paragraph (d) of paragraph twenty-five of the amendment to the bill of complaint. They deny that when gas is used for the manufacture of carbon black that it is utilized for fuel purposes.

3

These respondents deny the allegations set out in paragraph twenty-six of the amendment to the bill of complaint.

(a) Respondents deny that in the operation of complainant's properties there is no physical waste of gas; but say in this connection that the utilization of sweet gas for carbon black is an extremely wasteful process; further these respondents say that in the operation of its said plant the complainant is and has been blowing or allowing to escape into the air tremendous amounts of the residue gas after the gasoline content has been stripped, all of which results in tremendous physical waste of gas.

[fol. 100] (b) These respondents deny the allegation set out in sub-paragraph (b) of paragraph twenty-six of the amendment to the bill of complaint. In this connection respondents say that the result of the orders of the Commission will be a greater ultimate recovery of gas, and that a mass of testimony was heard by the Commission before the promulgation of the orders in question.

(c) Respondents deny that under said act it is required that the order of the Railroad Commission provide for the allocation of wells to the various markets, or provides for any connections therefor, to determine a fair price for gas. In this connection respondents say that the allocations of production of gas are properly made in the schedules of allowables promulgated by the Commission in connection with said orders.

(d) Respondents deny the allegations set out in sub-paragraph (d) of paragraph twenty-six of the amendment to the bill of complaint.

(e) Respondents deny the allegations set out in sub-paragraph (e) of paragraph twenty-six of the amendment to the bill of complaint, and the numerous sub-paragraphs thereunder.

Wherefore, these respondents pray as in their original answer in this cause.

(Signed) Wm. McCraw, Attorney General of Texas; (Signed) Wm. Madden Hill, Assistant Attorney General, Attorneys for Respondents. (Signed) C. C. Small, of Counsel.

[File endorsement omitted.]

[fol. 101] IN UNITED STATES DISTRICT COURT

[Title omitted]

COMPLAINANT'S REPLY TO ANSWER OF DEFENDANTS—Filed February 28, 1936

To the Honorable Said Court:

Now comes complainant in the above cause and files this, its reply to the answer of the defendants heretofore filed to complainant's original bill, and amendment thereof and says:

I

Complainant denies the allegations contained in the last paragraph of Part 5 of the original answer, wherein the defendants allege that complainant has eight sour wells and

thirteen sweet wells and that the gas produced from the sour wells is unfit to be used for light and fuel purposes.

II

Complainant denies all of the affirmative portions of the allegations of fact contained in Part 8 of the original answer of the defendants, wherein defendants allege that gas containing more than one and one-half grains of hydrogen sulphide per one hundred cubic feet is unfit and impractical to be used for light and fuel, or further uses to which sweet gas may be put; and that there is a growing demand [fol. 102] for sweet gas for light and fuel and that said act was adopted to conserve the natural resources of Texas and to prevent waste thereof, and that to rid the sulphur from the gas is an expensive treatment.

III

Complainant denies all of the affirmative allegations of fact contained in Part 9 of the answer to the original bill.

IV

Complainant denies all of the affirmative allegations of fact contained in Part 11 of the answer to the original bill, wherein defendants allege that the use of sweet gas in the manufacture of carbon black is a wasteful utilization of such gas; that sweet gas has many useful and beneficial purposes; that there is a great demand for such gas and that to permit its use for carbon black manufacture would deplete the sweet gas reserve and deprive the state of a market for such sweet gas.

V

Complainant denies all of the affirmative allegations of fact contained in Part 12 of the answer to the original bill.

VI

Complainant denies all of the affirmative allegations of fact contained in Part 16 of the answer to the original bill.

VII

Complainant denies the allegations contained in Part 18 of the answer to the original bill, wherein the defendants

allege that the wells producing in the Panhandle reservoir will not drain or deplete the reserves beneath complainant's land.

[fol. 103] VIII

Complainant denies all of the affirmative allegations of fact as contained in Part 20 of said answer to the original bill.

IX

Complainant denies all of the affirmative allegations of fact contained in Part 24 of the answer to the original bill.

X

Complainant denies all of the affirmative allegations of fact as contained in Part 1 of the defendants' answer to complainant's amendment to its bill.

XI

Complainant denies all of the affirmative allegations of fact contained in Part 2 of defendant's answer to complainant's amendment to its original bill, and particularly those allegations which attempt to allege that there is or will be no drainage from complainant's property involved in this cause, and that if a drainage should exist it was brought about by complainant's operations, and the further allegations that the utilization of sweet gas for carbon black purposes is a wasteful and destructive process and that the classification between sweet and sour is just and reasonable, and that there is a substantial ground for distinction and that sour gas as defined by said act is not usable for light and fuel purposes.

XII

Complainant denies all of the affirmative allegations of fact as contained in Part 3 of defendants' answer to the amendment to complainant's bill, and particularly those allegations contained in subdivision (a) thereof to the effect [fols. 104-106] that the manufacture of carbon black constitutes waste, and particularly to the allegations contained in subdivision (b) thereof, to the effect that there is no appreciable migration of gas to the sour area in the vicinity of complainant's plant; that there now exists a market for

gas produced from complainant's sweet wells, and that the allowable production as permitted by the Commission to the sweet and sour areas is approximately the same proportion to the total reserves in place.

Wherefore, complainant prays that it be given the relief prayed for in its original bill.

(Signed) L. M. Fischer, Amarillo, Texas, (Signed) F. W. Fischer, Tyler, Texas, Attorneys for Complainant.

[File endorsement omitted.]

[fol. 107] IN UNITED STATES DISTRICT COURT

[Title omitted]

Before Hutcheson, Circuit Judge, and Kennerly and McMillan, District Judges

OPINION OF THE COURT—Filed October 24, 1935

McMILLAN, District Judge:

Complainant, a Maine corporation, by Bill in Equity complains of the members of the Railroad Commission and the Attorney General of the State of Texas, and seeks to enjoin the enforcement so far as it is concerned of House Bill 266, Chapter 120, passed by the 44th Legislature, Regular Session 1935, and certain orders of the Railroad Commission purporting to have been made in pursuance thereof. The law and orders are attacked upon various constitutional grounds. The Federal jurisdiction, both on account of diversity of citizenship and federal question sufficiently appears. Jurisdiction in equity is also apparent. The case is one for a three-Judge Court and a hearing has been had before such court duly organized on Application for Preliminary injunction. The matter is now submitted on sworn [fol. 108] amended Bill and Answer, various exparte affidavits and briefs.

Complainant is the owner and operator of a casinghead gasoline plant located in Hutchinson County, Texas, and is connected with twenty-one wells in the vicinity of that plant.

Either by right of ownership or contract it has heretofore been receiving gas from those wells and extracting gasoline therefrom. Thereafter, under contract with Combined Carbon Company, it has been delivering the residue of that gas, less such as it used for plant operation, to said Carbon Company for the manufacture of carbon black.

The orders of the Railroad Commission now under attack attempt to classify Complainant's wells as sweet and sour; fourteen of them being designated as sweet and seven as sour. The purposes for which the sweet wells may be used are limited, with certain exceptions, practically to light and fuel; sour wells may still be used for the extraction of natural gasoline and the manufacture of carbon black.

Complaint attacked the Statute and orders issued thereunder on the conventional constitutional grounds, asserting generally that they are confiscatory, unreasonable, and arbitrary, deprive it of its property without due process of law, and impair the obligation of existing contracts. It alleges further that it has and can obtain no market or use for its gas other than that market and use which is now forbidden; that the closing down of its wells will cause its gas to be drawn off by other parties having markets for gas and drawing from the same general reservoir; that the manufacture of carbon black gas is a necessary and useful thing and can be and is being accomplished without waste. That the classification of, and differentiation between, sweet and sour wells is unreasonable and without foundation in fact.

[fol. 109] The Respondents, while admitting many of Complainant's fact allegations, disagree with the conclusions of law drawn therefrom and assert that the Statute and orders of the Commission are valid police regulations and have a reasonable relation to the conservation of the State's natural resources and prevention of waste; they deny Complainant is suffering any irreparable injury by reason of the Statute or orders such as to entitle it to an interlocutory injunction, and assert on the other hand that it has, or can without loss obtain for the time being, sufficient gas, both sweet and sour, to satisfy its requirements.

The facts adduced on the hearing by Affidavits take such a wide range that it would be impracticable without unduly prolonging this Opinion to set them out here. Generally speaking, the affidavits cover the kind and character of the

gas reservoir in the Panhandle; the difference between sweet and sour gas; matters with regard to pressure; migration of gas, etc., all of which has been fully set out and covered in the various other gas cases arising before this Court and involving the Panhandle field. Also on Complainant's part there is a strong showing as to the absence of waste in the operations of itself or its vendee, the Combined Carbon Company.

The Complainant claims that it will need about thirty million cubic feet of gas a day to fill its contract with the Combined Carbon Company. Under the orders of the Railroad Commission it seems to have that much gas available from the seven wells classified as sour. In addition to this thirty million cubic feet, it claims that it needs for plant and lease operation an additional eight million feet which according to its affidavits, under the orders of the Commission it will be unable to get.

Respondents by affidavits assert Complainant can obtain this gas from the fourteen wells classified as sweet, their [fol. 110] proof tending to show that from these wells the allowable under the Commission's orders will run somewhere between seven and eight million feet a day. This the Complainant in part denies, asserting on the contrary that their contracts with regard to their sweet wells only allows them to use that gas for casinghead gasoline operation.

The parties have briefed and submitted the case at cross-purposes. Respondents have assumed as an absolute arbitrary proposition of law that the Legislature had the general absolute right under any circumstances or conditions to prohibit the use of gas for the making of carbon black. On that postulate they rest their case so far as the general validity of the Statute and orders are concerned. Accordingly, they make no endeavor to establish as a factual proposition that the use of gas for making of carbon black is wasteful. They content themselves with the bald proposition that the Legislative fiat is sufficient to bind the court in that respect. The Complainant on the other hand, undertakes the burden of establishing that the manufacture of carbon black is not a wasteful use of its gas; that carbon black is one of the most necessary articles today known to commerce; that the gas is completely consumed in its manufacture; that the result accomplished by manufacturing car-

bon black is as useful and necessary as any other thing that could be accomplished by the burning of gas.

With the record in this attitude the Court is not content to pass upon the ultimate validity of this Act of the Legislature on this Application for a Preliminary Injunction. The right of the Legislature to regulate these various matters connected with the production of oil and gas, in so far as Texas is concerned, has always been hinged on the doctrine of conservation of natural resources and the prevention of waste. Amazon Petroleum Corporation v. Rail [fol. 111] road Commission, 5th Fed. (Supp) 633; McMillan v. R. R. Com., 51 Fed. (2) 400; E. C. Henderson, Inc. v. R. R. Com., 56 Fed. (2) 218; Daneiger Oil & Ref. Co. v. R. R. Com., 49 S. W. (2) 837, 842; 56 S. W. (2) 1075 (C. C. A.); Peoples Pet. Producers Co. v. Sterling, 60 Fed. (2) 1041); Peoples Pet. Producers Co. v. Smith, 1 Fed. (Supp) 361; Canadian River Gas Co. v. Terrell, 4 Fed. (Supp) 222. If the regulation has no reasonable relationship to these matters, then it constitutes an unreasonable interference with the rights of private property. We are unwilling at this time to hold that the mere legislative declaration that a certain use of gas is wasteful is conclusive and are inclined on the contrary to the opinion that the fact question involved is justiciable.

However, it does not follow that because of these conclusions Complainant is entitled to its interlocutory injunction as a matter of right. These preliminary injunctions do not issue as a matter of course. Coupled with a prima facie showing indicating that Complainant will eventually be able to establish the invalidity of the orders attacked in the trial on the merits, there must be clear and strong showing of immediate and irreparable injury in event the enforcement of the orders attacked is not stayed. We are not at all convinced that the Complainant has discharged that burden in this case.

Its Secretary and General Manager in his affidavit says that during the month when the Bill was filed the carbon plant actually utilized a daily average of 27,426,000 cubic feet of gas; that the daily allowable from the seven wells classified as sour, less the gasoline content which is extracted, is now approximately 31,277,800 cubic feet, thus leaving almost 4,000,000 cubic feet over and above what the carbon plant was using in the month of July. There

is a general statement in his affidavit that the Affiant is informed that the future requirements of the Carbon Company will run its daily use up to 30,000,000 cubic feet a [fol. 112] day, but there is nothing further than this general assertion to support that fact. It is perfectly obvious that so far as the carbon black phase of the matter is concerned Complainant has, even under the orders attacked, more than enough gas to protect the situation with probably a surplus of several million cubic feet a day.

But Complainant contends it has use for approximately an additional 8,000,000 cubic feet daily for plant and lease operations.

Respondents say in answer to this, by way of plea and affidavits, that Complainant has under contract from its various other wells approximately 8,000,000 cubic feet per day which can be so used under the existing orders. The Complainant denies this and says on the contrary that under its contracts this gas can only be used for the manufacture of casinghead gasoline. An inspection of one of these contracts, said to be typical, indicates that the method of payment agreed on between Complainant and its Vendees is by a determination of the proportionate part of the gasoline stripped from the gas. The contract expressly provides that it is subject to all legal rules and regulations now in force or which may thereafter be promulgated. There is no clear, express showing that Complainant will not be able to obtain, either from that source by additional contract if necessary, or from other sources the gas which it may need for plant and field operation. Furthermore the statement as to this amount of gas needed for those purposes is merely the unsupported conclusion of the Affiant, General Manager, and no facts or detailed account is given with regard to, or of, the necessity which makes it imperative for Complainant to have this additional amount of gas.

[fol. 113] Having all these matters in mind and giving due regard to the proper balancing of conveniences, it is the opinion of the Court that the Complainant has failed to establish that the present temporary enforcement of the orders complained of is causing or will, prior to the time that the case can be tried on its merits, cause Com-

plaintant any irreparable injury. It follows that the Preliminary Injunction prayed for will be denied.

(Signed) T. M. Kennerly, District Judge. McM. (Signed) J. C. Hutcheson, Jr., Circuit Judge. McM. (Signed) Robert J. McMillan, District Judge.

[File endorsement omitted.]

[fol. 114] IN UNITED STATES DISTRICT COURT

[Title omitted]

ORDER DENYING APPLICATION FOR TEMPORARY INJUNCTION—Filed November 15, 1935

On this, the 30th day of August, A. D. 1935, came on to be heard in the above entitled and numbered cause the application of the complainant herein for an interlocutory injunction to restrain the Railroad Commission of Texas, and the individual members thereof, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act either with or under them, and the Attorney General of Texas, William McCraw, and his assistants, from enforcing, or attempting to enforce by order, rule, regulation or otherwise, the provisions of H.B. 266 enacted at the regular session of the 44th Legislature of Texas, and commonly designated as the gas wastage statute, and all orders issued or promulgated by the Railroad Commission similar thereto having for their purpose and effect the prohibiting of complainant from producing and utilizing in its casinghead gasoline manufacturing plant gas from its wells classified by the Railroad Commission as sweet gas wells and described in the bill of complaint herein until October 1, 1935, and as long thereafter as the residue of such gas is utilized in the efficient manufacture of carbon black; and

[fol. 115] The Hon. Robert J. McMillan, having called to his assistance in this cause the Hon. T. M. Kennerly, District Judge, and Hon. J. C. Hutcheson, Jr., Circuit Judge, and said cause having been heard before the court as a three-judge court under the provisions of Section 380, Title 28, U.S.C.A., and the court as so constituted having heard the pleadings of the parties, the evidence introduced, and having considered the same, together with the briefs and

arguments of the parties, is of the opinion that the relief sought by the complainant by way of a temporary injunction against the doing of the acts hereinabove described should in all things be denied.

It is Accordingly Ordered, Adjudged and Decreed by the court that the application and prayer of the complainant, The Henderson Company, for a temporary and interlocutory injunction against the Railroad Commission of Texas, Ernest O. Thompson, C. V. Terrell, Lon A. Smith and against William McCraw as Attorney General of Texas, the respondents, be and the same is hereby in all things denied.

(Signed) J. C. Hutcheson, Jr., Circuit Judge.
(Signed) T. M. Kennerly, District Judge.
(Signed) Robert J. McMillan, District Judge.

[File endorsement omitted.]

[fol. 116] In United States District Court for the Western District of Texas, Austin Division

In Equity

No. 535

The Henderson Company

vs.

Ernest O. Thompson et al.

and

No. 581

Portland Gasoline Company

vs.

Ernest O. Thompson et al.

Before Hutcheson, Circuit Judge and Kennerly and McMillan, District Judges

Opinion—Filed March 31, 1936

McMillan, District Judge:

These two cases are now before the Court for final hearing on the merits. While there are slight variations in the facts with regard to the two Complainants the general principles underlying the cases are the same, and the two

cases while not consolidated, were tried together and may be disposed in the one opinion.

The Henderson case has been before this Court before on Application for Preliminary Injunction. Henderson Company v. E. O. Thompson, et als., 12 Fed. Supp. 519. The Portland case has not heretofore been before the Court on Application for Preliminary Injunction, but the Complainant, while continuing to press for temporary relief, has agreed, in open Court, with Respondents that the case will be considered as also finally submitted on its merits. The Henderson Company is a Maine corporation and the Portland Company is a Delaware corporation and the Court has jurisdiction in both cases, both because of diversity of citizenship and federal question, coupled with [fol. 117] the requisite amount in controversy. Jurisdiction in equity is also apparent on the face of the records.

Complainants assail House Bill 226, Chapter 20, passed by the 44th Legislature, Regular Session, 1935, and certain orders of the Railroad Commission purporting to have been made by virtue thereof. Their grievance against the Statute lies in the restrictions which it places upon the use of sweet gas. Their attack against the orders of the Commission is incidental inasmuch as those orders simply purport to carry out the mandate of the Statute and classify certain of Complainants' wells as sweet and sour. While the Bills of Complaint also attack the orders of the Commission with regard to the proration features thereof, that phase of the matter has been expressly abandoned by the Henderson Company insofar as this case is concerned, by statements made in its brief, and impliedly by the Portland Company by its failure to press that contention, either in its evidence or its briefs.

Accordingly, the matter at issue narrows down to whether the action of the Legislature in restricting the uses to which sweet gas may be put and in defining what constitutes sweet gas, is unconstitutional as applied to Complainants. The Statute insofar as it is called in question here will, for convenience, be footnoted in this opinion.*

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*(Acts 44 Leg., 1935. Vernon's Ann. Civ. Stat. (Supp.) Art. 6008)

Section 1. Declaration of policy: In recognition of past present, and imminent evils occurring in the production and

[fol. 118] Complainants either by contract or ownership have been taking gas from a great number of wells in the Panhandle field in Texas, and after stripping same for its gasoline content and using a part of the remainder for plant and lease purposes, delivering the residue by virtue of contract to certain carbon black plants, where that gas is burned for the purpose of making carbon black without further use being made thereof. After the passage of the Statute attacked, the Railroad Commission conducted a series of tests and classified Complainants' wells as sweet or sour. A great majority of the Henderson Company's wells have been classified as sweet and the allowable from its sour wells is insufficient to cover its requirements. Thirteen of the Portland Company's wells produce casinghead gas which may be used for carbon black manufacture, but the production from those wells, coupled with its allowable from its sour gas wells, is insufficient to meet its requirements. The rub with regard to both Complainants lies in the inhibition in the Statute against the use of sweet gas for the manufacture of carbon black. If Complainants were

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use of natural gas, as a result of waste in the production and use thereof in the absence of correlative opportunities of owners of gas in a common reservoir to produce and use the same, this law is enacted for the protection of public and private interests aaginst such evils by prohibiting waste and compelling ratable production.

Article 6008 (of the R. C. S. of Texas of 1925 as amended, etc.) is hereby amended so as to hereafter read as follows:

Sec. 2. Unless the context otherwise requires, the words defined in this section shall have the following meaning when used in this article to-wit:

* * * * * * *

(g) The term "sour gas" shall mean any natural gas containing more than one and one-half grains of hydrogen sulphide per one hundred (100) cubic feet or more than thirty (30) grains of total sulphur per one hundred (100) cubic feet, or gas which in its natural state is found by the Commission to be unfit for use in generating light or fuel for domestic purposes.

allowed to use the gas from their sweet wells to fulfill their contracts with the carbon black companies they would be without complaint so far as the present case is concerned. Accordingly, as indicated, the matter finally narrows down to the question whether the Legislature was within the law [fol. 119] in defining what constitutes sweet and sour gas and forbidding the use of the sweet gas for the making of carbon black.

Complainants attack the Statute on substantially three grounds, one of which divides itself into two propositions. First, they assert that the Statute bears no reasonable relationship to the prevention of waste and accordingly, is not a conservation of the natural resources of the State and constitutes an unreasonable interference with and confiscation of their property. Second, they assert that the Statute unlawfully discriminates between the owners of sweet and sour gas and as a further proposition in this connection, they say that the definition of sour gas contained in subdivision (g) of Section 2 is without basis or foundation in fact and accordingly void. Third, they assert that the op-

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(h) The term "sweet gas" shall mean all natural gas except "sour gas" and "casinghead gas."

(i) The term "casinghead gas" shall mean any gas and/or vapor indigenous to an oil stratum and produced from such stratum with oil.

(j) The term "natural gasoline" shall apply to gasoline manufactured from casinghead or from any natural gas.

Sec. 3. The production, transportation or use of natural gas in such manner, in such amount, or under such conditions as to constitute waste is hereby declared to be unlawful and is prohibited. The term "waste", among other things, shall specifically include:

* * * * * * *

(j) The use of sweet gas produced from a gas well for the manufacture of carbon black.

Sec. 7. After the expiration of ten days from the time of encountering gas in a gas well, no gas from such well shall be permitted to escape into the air, and all gas produced therefrom shall be utilized for the following purposes:

eration of the Statute impairs the obligation of their contracts with the carbon black companies in violation of the Constitution of the State of Texas.

The case has been thoroughly developed by ex parte affidavits introduced by agreement of the parties, by oral testimony and by numerous maps, exhibits and much documentary evidence. It has been thoroughly argued and fully and carefully briefed by both sides. The evidence has taken [fol. 120] a wide range and it is impracticable to do more than summarize it and refer to it briefly in the course of this opinion.

The carbon black industry has been nomadic, journeying from field to field ever in quest of cheap gas. For over sixty years it has existed in this country moving generally Westward, first in Pennsylvania, then in West Virginia, then Louisiana, then Kentucky and latterly coming into Texas, Oklahoma, Utah, Montana and Wyoming. As the various States tightened their regulations by Statutes and

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(1) No sweet gas shall be utilized except for:

(a) Light or fuel.

(b) Efficient chemical manufacturing, other than the manufacture of carbon black.

(c) Bona fide introduction of gas into oil, or gas bearing horizon, in order to maintain or increase the rock pressure or otherwise increase the ultimate recovery of oil or gas from such horizon.

(d) The extraction of natural gasoline therefrom when the residue is returned to the horizon from which it is produced.

(2) In addition to the purposes for which sweet gas produced from a gas well may be used, sour gas may be used for efficient chemical manufacturing purposes, including the manufacture of carbon black, provided it is utilized in a plant producing a recovery of not less than one pound of carbon black to each one thousand (1,000) cubic feet of gas, and provided further that the gasoline content is removed and saved from such sour gas before the same is utilized for carbon black.

(3) Casinghead gas may be used for any beneficial purpose, which includes the manufacture of natural gasoline."

orders the industry moved on until now it is largely centered in the Panhandle field of Texas and from that giant reservoir approximately eighty percent of the carbon black manufactured today is being derived.

There have been few improvements made in the method of manufacturing since 1892, the one commonly employed, and employed by Complainants, being the channel process. It is unnecessary to describe this process here as it is fully described by the Supreme Court in Walls v. Midland Carbon Co., 254 U. S. 300. Either sweet or sour or casinghead gas may be used in its production, and from the burning of one thousand cubic feet of gas approximately one and one-half pounds of carbon black is made. The gas is entirely [fol. 121] used in the manufacture of carbon black and there is no residue that can be devoted to any other useful purpose.

Carbon black is worth about four cents a pound. From the gas before its ultimate burning there is stripped a fraction of a gallon of gasoline, which is worth from two to three cents. A producer of sweet gas who is able to market same for Statutory purposes receives about three or four cents a thousand in the field. When delivered at the burner tips it sells for various greatly increased amounts. The producers of gas who sell to the Companies that strip it and then burn it for carbon black receive less than a cent per thousand cubic feet.

Sweet gas is available without treatment for fuel and light, but sour gas can not be so used without being scrubbed or processed, as the hydrogen sulphide content makes it corrosive thereby injuring the pipe lines, equipment, burners and other mechanical appliances through which it has to pass. In addition thereto, its odor and detrimental effect on the health of persons adjacent to it when burning renders it undesirable to use for fuel or light.

There is evidence in the record to indicate that probably as much as thirty pounds of carbon can be recovered from one thousand cubic feet of gas by other processes than those used by Complainants. The evidence would also indicate that this carbon so recovered is not what is commonly known as carbon black inasmuch as it is coarser in its texture and not available for many of the uses to which carbon black is put. There is some indication that restriction upon the use of gas may cause advancement

in the industry which will recover a greater yield of carbon black, but up to the present time there is no indication that any better methods have been developed than the channel process.

Carbon black has a wide range in its usefulness, it being used in the manufacture of printer's ink, automobile tires, [fol. 122] rubber products, paint, varnish, typewriter ribbons, colored paper, lacquers, stove polish, shoe polish, book binders' board, crayons, golf balls, tarpaulins, insulating material, phonograph records, cement, tile and artificial stone. So far as is known it can only be manufactured from natural gas.

There are twenty-nine carbon black plants operating in the Panhandle field with an average consumption of approximately five hundred and fifty million cubic feet per day. This amount is only slightly less than the average daily amount taken by all the pipe lines for fuel and light purposes. When the carbon black industry first came into the Panhandle field it practically used only casinghead gas, but afterwards by virtue of amended Statutes and orders it commenced to use in addition thereto, both sweet and sour gas. The Panhandle field is the largest gas field known in the world today. It has a length of about 125 miles and varies in width from 10 to 40 miles. While the field is apparently a common reservoir there is a line of demarkation which fairly separates the sour gas area from the sweet gas area. Along the sour gas area are oil fields and in the past great waste of gas has taken place adjacent to those fields. Accordingly, as a general thing the pressures in the sour gas area are lower than those in the sweet gas area. Lowering the pressure tends to cause migration from higher pressure areas to lower pressure areas, but the length of time which it takes to accomplish this is not definitely known. Expert opinion, based upon substantial facts, sustains the view that there is enough sour gas in reserve in the Panhandle field to fulfill the world's requirements of carbon black for many years to come.

The statement of facts with regard to this vast field and the carbon black industry might, on the record as it now stands, be protracted indefinitely. We consider it unnecessary to go into the matter any further for the purposes of [fol. 123] this decision. The matters have been covered

generally by this Court in many other cases involving this same field.

In line with Complainants' contentions it is first necessary to consider whether the Statute has any reasonable relationship to the conservation of the natural resources of the State and the prevention of waste. We held on the Application for Preliminary Injunction in the Henderson case that the mere Legislative declaration of waste was not conclusive if facts could be adduced which clearly indicated the contrary. The Constitution of the State of Texas delegates to the Legislature the power to conserve the natural resources of the State, and that gas constitutes one of those natural resources is now too well settled to admit of further controversy.

Regulations looking to the conservation of gas and the prevention of its waste may be validly made, and if they have a reasonable relationship to those things it is immaterial that they interfere with the uses which the individual may desire to make of his property. A Texas land owner owns the gas in place under his land and he may withdraw the same by mining operations, and if in the course of so doing, part of his neighbor's gas migrates to his land he may withdraw that gas without liability. The statement of these facts, coupled with the known migratory character of gas, immediately makes it apparent that there must be some limitations upon these property rights which exist in the land owner. While he has the unquestioned right to withdraw his gas, and such gas as may migrate to his land, it is perfectly evident that if he does so in a wasteful manner or for a wasteful purpose he has exceeded any property right which he may have been thought to have had. The migratory nature of gas distinguishes it from other minerals which are fixed. An owner of a coal mine or of a sulphur mine might withdraw his minerals and destroy them without injury to his neighbor, other than [fol. 124] such injury as he sustains in common with the general public in that economic loss, but the owner of a gas well, who under the capture doctrine, withdraws gas which has theretofore been his neighbor's and uses it wastefully, thereby, not only destroys a natural resource of the State, but impinges upon the rights of others in the common reservoir.

These principles so far as matters pertaining to underground waste per se, such as operations which cause chan-

nelling, coning, entrapment, etc., are concerned, are now undisputed. There is no good reason why they should not equally apply to forbid the withdrawal of gas from a common reservoir to be wastefully used above the ground. The effect of the Statute is in fact to regulate the gas in the reservoir by preventing its withdrawal for use in a wasteful manner.

It is thoroughly settled that the popping off of gas into the air is a wasteful practice which may be forbidden; that the production of an oil well with an inefficient gas oil ratio may be stopped; that gas wells may under certain circumstances be ordered plugged, and the stripping of gas for the purpose of securing its gasoline content may be prohibited. See Lindsley v. Natural Carbonic Co., 200 U. S. 61; Ohio Oil Co. v. Indiana, 177 U. S. 190; Bandini Petroleum Co. v. Superior Court, Los Angeles County, California, 284 U. S. 8 and F. C. Henderson Inc. v. Railroad Commission, 56 Fed. (2d) 218.

If this be true how can it be successfully argued that it lies beyond the power of the State to forbid the burning of sweet gas to manufacture carbon black. It is unquestionably true that carbon black is a useful product necessary to the commerce of the world, but the same can be said of gasoline. If the stripping of gas to obtain gasoline is held to be wasteful, as was done in the Henderson case, because of the disproportion between the large [fol. 125] amount of gas used and the small amount of gasoline recovered, is there any legitimate reason why the same rule should not be applied to the manufacture of carbon black? Is the Legislature not entitled to consider and determine whether the results obtained by destroying this natural resource are commensurate with the injury that is done?

The question of the value of the product obtained as compared to the value of the raw gas is not at all determinative of the matter. We are not convinced that Complainant's method of aporpach, that is to say, the value of a pound of carbon black plus the gasoline stripped as compared to the sale price in the field of a thousand cubic feet of gas is correct. Many contingencies enter into the value of these two commodities which are not covered by the simple statement of their market price in the field. However, regardless of that question, the matters of value are not controlling. The question of the utility of carbon black

as against the utility of sweet gas for light and fuel does not finally determine the issue. As said by the Supreme Court in the Walls case in passing on that contention:

"The fact, however, is but of incidental importance. The determining consideration is the power of the State over, and its regulation of a property in which others besides the companies may have rights and in which the State has an interest to adjust and preserve, natural gas being one of the resources of the State. And in this consideration it is more important to consider not for what a particular owner uses the gas, but the proportion of his use to that of others, or it may be, the prevention of use by others. * * *."

The State in the conservation of its natural resources is not without power to consider the uses to which those resources are most appropriately adapted and to conserve certain resources for public uses, although the result thereof may be to destroy another use.

"When forced to such a choice the State does not exceed its constitutional powers by deciding upon the destruction of one class of property in order to save another which, in [fol. 126] the judgment of the legislature, is of greater value to the public." Miller v. Schoene, 276 U. S. 272.

If upon the facts of the case the legislature has decided that the burning of sweet gas to make carbon black constitutes too great a destruction of a natural resource of the State for the result accomplished, and that on the other hand, it is more desirable for that gas to be devoted to other necessary uses, it does not lie within the power of the Court to review that determination and substitute its judgment, conscience and discretion for the judgment, conscience and discretion of the legislative body. Unless the determination of the Legislature is clearly without factual support thereby rendering it arbitrary and unreasonable the Court is without power to intervene.

Having these general principles in mind and carrying in mind also the facts as we have heretofore stated them, we are unable to say that the Statute attacked does not bear a reasonable relationship to the conservation of the natural resources of the State. The views which we have expressed are directly sustained by the decision of the Supreme Court in Walls v. Midland Carbon Co., Supra, and

generally by such decisions as Ohio Co. v. Indiana, 177 U. S. 190; Bandini Petroleum Co. v. Superior Court, Los Angeles County, California, 284 U. S. 8 and Henderson v. Railroad Commission, 56 Fed. (2) 218.

Complainants attempt to differentiate the Walls case because of the difference in the title to gas in place as between Texas and Wyoming. With regard to the matters at issue here the distinction is without importance. Oxford Oil Co. v. Atlantic Oil & Producing Co., 16 Fed. (2) 639; 22 Fed. (2) 597.

We come accordingly then to Complainants' second contention that the Statute is void because of discrimination as between the sweet and sour gas owners and because there is no basis in fact for the definition of sour gas. [fol. 127] There can be no question of the right of the legislature to classify if the classification operates equally upon all parties within the class and is based upon some valid grounds of distinction. Lindsley v. Natural Carbonic Gas Co., Supra; Middleton v. Texas Power & Light Co., 249 U. S. 152.

That the Statute operates equally upon all parties within the classification can not be gainsaid. That the classification is not arbitrary because resting upon a reasonable basis we think to be equally apparent. It is unnecessary to rehearse the facts. Briefly it may be stated that sweet gas is available without treatment for light and fuel uses; sour gas is not. While carbon black may be made from sweet gas it can also be made with practically equal facility from sour gas. As a matter of marshalling the natural resources of the State the legislature has the power when one resource is fitted for two uses and another resource for only one, to classify those natural resources as to the use to be made of them. That is to say, that proceeding on the premise that the regulation generally is one tending to the conservation of the natural resources of the State there is no reason why those resources should not be classified if a valid difference exists between them.

The State at this time does not completely outlaw the carbon black industry, but on the contrary devotes to it an enormous supply of its gas reserves. The distinction made between sweet and sour gas having its basis upon a solid foundation of fact. Complainants are in no position to

complain because sour gas may be used for carbon black while sweet gas may not.

Complainants' contention that the legislative definition of sour gas is unsupported by the facts is untenable. While the evidence indicates that gas containing approximately one and one-half grains of hydrogen sulphide per hundred cubic feet may be very easily and economically [fol. 128] processed, the fact still remains that it has to be treated before it is available for use for light and fuel to the same extent, and as satisfactorily, as gases of lower sulphide content. The Court is unable to say the legislative definition is arbitrary or unreasonable.

As heretofore noted, Complainants' third ground of attack rests upon the claimed impairment of their contracts with the carbon black companies in violation of Section 16, Article 1 of the State Constitution. Here they base their reliance upon Traveler's Insurance Co. v. Marshall, 76 S. W. (2) 1007, a decision by the Supreme Court of Texas. The decision does not support their position insofar as the facts of these cases are concerned. There the effect of the Act, which was a Moratorium Statute, was to operate directly upon certain contractual obligations. Here the Act touches the contracts only incidentally and by virtue of an exercise of the inherent police power existing in the State. While the power of directly impairing contractual obligations may have been withdrawn from the general power of the Government by the Texas Constitution, that instrument has never been held to avoid a police Statute dealing directly with physical things in the interest of the public welfare, and touching contractual relationships only incidentally as they may have attached to those physical things prior to the passage of the Statute.

Where matters affect the public safety, health, welfare, morals or well being they may not by contract be placed beyond the power of the State to regulate and control them. The argument defeats itself. If it were conceded to be true any individual could by contract place his business or property beyond the realm of the police power. The protection relied on by Complainants is given only against direct impairment and not that indirect abrogation, which [fol. 129] flows incidentally from the valid exercise of the police power.

The parts of the Statute and the orders under attack here are authorized by the Constitution of the State of Texas and in no way contravene the Constitution of the United States. Unlike the proration order concerning which we have written in an opinion handed down today in Consolidated Gas Utilities Corporation, et al. v. Thompson, et al. the Statute and order in question insofar as they define and classify sweet, sour and casinghead gas and regulate the use thereof, are true waste measures, bearing a reasonable relationship to the conservation of the natural resources of the State. As such they must be sustained.

The injunction will be denied.

(Signed) J. C. Hutcheson, Jr., Circuit Judge.
(Signed) T. M. Kennerly, District Judge. (McM.)
(Signed) Robert J. McMillan, District Judge.

[File endorsement omitted.]

[fol. 130] In United States District Court for the Western District of Texas, Austin Division

No. 535. In Equity

The Henderson Company, a Corporation, Complainant,

versus

Ernest O. Thompson et al., Respondents

Order Denying Permanent Injunction—Filed March 31, 1936

On the 28th day of February, 1936, came on to be heard the above entitled and numbered cause for trial on the merits and on the application of the complainant herein for a permanent injunction to restrain the Railroad Commission of Texas, and the individual members thereof, Ernest O. Thompson, C. V. Terrell and Lon A. Smith, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act either with or under them, and the Attorney General of Texas, William McCraw, and his assistants, from enforcing and attempting to enforce, by order, rule, regulation or

otherwise, the provisions of House Bill 266, enacted at the Regular Session of the 44th Legislature of Texas, and commonly designated as the gas wastage statute, and all orders issued or promulgated by the Railroad Commission similar thereto having for their purpose and effect the prohibiting of complainant from producing and utilizing in its casinghead gasoline manufacturing plant gas from its wells classified by the Railroad Commission as sweet gas wells, as described in the bill of complaint herein, and utilizing the residue of such gas in the manufacture of carbon black, and [fol. 131] enjoining and restraining the defendants from enforcing as against the complainant the terms and provisions of said act prohibiting the use of sweet gas and the products from sweet gas wells in the manufacture of carbon black; and,

The Honorable Robert J. McMillan having called to his assistance in this cause the Honorable T. M. Kennerly, District Judge, and the Honorable Joseph C. Hutcheson, Jr., Circuit Judge, and said cause having heretofore been heard upon the application of the complainant herein for a temporary injunction against the enforcement of said State statute under the provisions of Section 380, Title 28, U. S. C. A., said court, as heretofore constituted, sat as a three-judge statutory court to hear this cause finally and on its merits, and the court as so constituted having heard the pleadings of the parties, the evidence introduced by way of exhibits, affidavits and testimony of witnesses, together with the argument of counsel, and the briefs filed by the parties under the direction of the court, and having fully considered the same, is of the opinion and finds that the relief sought by the complainant herein by way of a permanent injunction against the enforcement by these defendants, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act either with or under them, of the terms and provisions of House Bill 266, enacted at the Regular Session of the 44th Legislature of Texas, and commonly designated as the gas wastage statute, and those provisions thereof prohibiting the use of sweet gas or the residue therefrom for the manufacture of carbon black, should be in all things denied, and that the complainant herein should be denied any relief as [fol. 132] against the defendants by reason of any of the matters set out in the bill of complaint herein.

It is Accordingly Ordered, Adjudged and Decreed by the court, that the application and prayer of the complainant, The Henderson Company, a corporation, for a permanent injunction against the Railroad Commission of Texas, Ernest O. Thompson, C. V. Terrell, and Lon A. Smith, the individual members thereof, and William McCraw, as Attorney General of Texas, the defendants, their deputies, assistants, employees, subordinates, clerks, successors in office, and all other persons with authority to act either with or under them, be and the same is hereby in all things denied and refused, and it is ordered that said defendants, and each of them, go hence in this cause without day and that they, and each of them, do have and recover of and from the complainant herein, The Henderson Company, a corporation, all costs herein as to them incurred.

This the 31st day of March, A. D. 1936.

(Signed) Jos. C. Hutcheson, Jr., United States Circuit Judge. (Signed) T. M. Kennerly, United States District Judge. (Signed) Robert J. McMillan, United States District Judge.

[File endorsement omitted.]

[fol. 133] IN UNITED STATES DISTRICT COURT

[Title omitted]

FINDINGS OF FACT AND CONCLUSIONS OF LAW IN COMPLIANCE WITH EQUITY RULE No. 70½—Filed June 17, 1936

In accordance with the provisions of Equity Rule No. 70½ the court here and now finds the facts specially which were adduced upon the trial of this cause and states separately its conclusions of law thereon, which findings of fact and conclusions of law are as follows:

1

The complainant, The Henderson Company, is a private corporation duly incorporated, organized and existing under the laws of the State of Maine, with a permit to do business in the State of Texas, and is a resident citizen

of the State of Maine where it has its domicile. The defendants Ernest O. Thompson, C. V. Terrell and Lon A. Smith are the duly elected, qualified and acting members of the Railroad Commission of Texas, which is an administrative body organized and existing under the Constitution and laws of the State of Texas. The defendant William McCraw is the duly elected, qualified and acting At- [fol. 134] torney General of the State of Texas. The defendants all have their official residence in Travis County, Texas, and all of said defendants are resident citizens of the State of Texas.

2

The complainant, The Henderson County, acquired all of the capital stock and assets of F. C. Henderson, Inc., and the charter of the latter company was surrendered on or about September 1, 1934. The complainant, The Henderson Company, owns and operates a natural gasoline manufacturing plant in Sanford, Texas, which plant was built and constructed by F. C. Henderson, Inc., in the year 1929, at an initial cost of approximately three hundred fifty thousand dollars ($350,000.00), and thereafter the same was enlarged and additions made thereto, including gathering pipe lines and other properties by the said F. C. Henderson, Inc., and the complainant, The Henderson Company, until the total investments in said plant and property connected therewith exceeds the sum of five hundred thousand dollars ($500,000.00). That said F. C. Henderson, Inc., began processing gas in said plant in the Fall of 1929 from various leases in the Sanford area in the Panhandle field of Texas covering which said F. C. Henderson, Inc., acquired gas contracts, all of such contracts originally entered into by F. C. Henderson, Inc., or F. C. Henderson acting for said corporation are now owned and held by The Henderson Company, complainant, and since that time The Henderson Company, complainant, has acquired additional gas contracts on additional leases in the Sanford area and has acquired by purchase certain oil and gas leases. That prior to August 1, 1935, The Henderson Company was connected with and processing gas from 21 wells. The nature of the operation of the plant of The Henderson Company at Sanford, Texas, is the extraction of the gasoline content contained in the gas fur- [fol. 135] nished to such plant, the residue gas being sold to the Combined Carbon Company for utilization in its nearby

carbon black plant. Small amounts of residue are used for fuel in said gasoline plant and in said carbon black plant. Gas contained in the Panhandle reservoir contains an average of approximately .35 gallons of gasoline to every 1000 cubic feet of gas. In various oil producing areas located in the Panhandle reservoir where gas comes into immediate contact with oil the gasoline content is higher.

3

The plant of complainant and the wells to which it is connected are located near Sanford, Hutchinson County, Texas, in what is known as the Panhandle Gas Field, such field is approximately 125 miles in length and varies in width from 10 to 40 miles; while the field is apparently a common reservoir there is a line of demarcation which fairly separates the sour gas area from the sweet gas area. Along the sour gas area there are oil fields and in the past waste of gas has taken place adjacent to these fields. Accordingly, as a general thing the pressures in the sour gas area are lower than those in the sweet gas area. Lowering the pressure tends to cause migration from higher pressure areas to lower pressure areas, but the length of time which it takes to accomplish this is not definitely known. Expert opinion, based upon substantial facts, sustains the view that there is enough sour gas in reserve in the Panhandle field to fulfill the world's requirements for carbon black for many years to come. The Panhandle oil and gas field contains 1,504,386 acres, there being 1,066,662 acres of sweet gas, 437,724 acres of sour gas territory. The field is located in the counties of Hartley, Moore, Hutchinson, Potter, Carson, Gray and Wheeler. The oil producing area covers a belt about 90 miles in length lying on the northeast [fol. 136] flank of the structure. Development throughout the Panhandle field has long since proved it to be the largest known reserve of natural gas in the United States. Gas was first discovered in northern Potter County in December 1918. The gas production was developed only incidentally in the search for oil. The first important oil was discovered in 1925 and the majority of the oil pools were developed in 1926 and 1927. The development of gas became prominent about 1926 and continued until 1929 when it was temporarily halted by the depression. Since 1933 the gas field has developed at a very rapid rate. The oil

wells in the oil pools in the field were as a general rule drilled through one or more gas containing strata before entering the oil containing stratum, and in many instances the wells were so completed as to cause production of gas from the gas strata along with the oil and gas from the oil strata with the result that tremendous quantities of gas have been produced with the oil, large portions of it coming from gas producing strata above oil producing strata. This gas was in a large part blown into the air and it has been estimated that in excess of two trillion cubic feet of gas produced in this manner has been wasted into the air. Coincident with the development of the Borger oil pool natural gasoline plants were erected in the field in which considerable portions of the gas produced therein was processed for the extraction of the gasoline content thereof and there being no market for the stripped gas, called residue gas, resulting from the operation of said plant the bulk of such residue gas was wasted into the air. In varying degrees the same is true in other oil pools as they were developed and operated.

[fol. 137] 4

The Panhandle field is so far removed from centers of population and industrial activity that little value was at first placed upon the enormous quantities of gas therein found, but, due to the development of the natural gasoline plants and the resultant abundant supply of cheap residue gas that was being wasted into the air, the carbon black industry was attracted to the area, and in September, 1926, the first carbon black plant was completed. It was located in the Borger pool, and proceeded to burn considerable quantities of such residue gas for the manufacture of carbon black. Twenty-nine carbon black plants have been built and placed in operation in the field. The combined throughput capacity of said plants is approximately 570,000,000 cubic feet of gas daily.

The carbon black industry including existing carbon black factories, equipment and residue gas transportation lines from natural gasoline plants, had become established in the Texas Panhandle oil and gas field prior to August 12, 1931, with the following exceptions:

1. About November 1935 ground was broken for a carbon black factory in Moore County, Texas.

2. The factory of the Combined Carbon Company was constructed during the early part of 1935, preparation having been made during the latter part of the year 1934.

3. The United Carbon Factory at Sanford, Hutchinson County, Texas.

Prior to August 12, 1931, only casinghead gas residue was lawfully available for carbon black manufacture.

During the year 1934 intense efforts were made by parties interested in stopping the waste of gas well gas residue to interest the general public in a legislative change that would require in every event utilization of gas well gas [fol. 138] after natural gasoline extraction. This interest was aroused by public addresses, radio talks and newspaper advertisements in all parts of Texas and especially in the Texas Panhandle.

5

The demand for sweet gas for light and fuel consumption is increasing in the Panhandle field while the demand for carbon black manufacture, though increasing slightly, is comparatively static.

The twenty-nine carbon black plants operate in the Panhandle field with an average consumption of approximately five-hundred-fifty million cubic feet. This amount is only slightly less than the average daily amount taken by all of the pipe lines for fuel and light purposes. When the carbon black industries first came into the Panhandle field they practically used only casinghead gas, but afterwards by virtue of amended statutes and orders they commenced, in addition thereto, to use both sweet and sour gas.

6

Beginning with the construction of the Northern Texas Utilities Company line for transporting gas to towns in northern Texas in January 1926, a number of major pipe line companies were constructed from the field to various centers where gas was marketed for light and fuel purposes.

7

The total length of these major pipe line companies is approximately several thousand miles and their capacities many hundred million cubic feet of gas daily. They have

not and will not take or transport sour gas through their lines.

[fol. 139] 8

In addition to the major pipe lines, there are pipe lines of lesser capacities serving numerous towns and cities in the immediate vicinity of the field with a throughput capacity of sixty-five million cubic feet of gas per day.

9

The Railroad Commission of Texas has divided the Panhandle field into two fields, the West Panhandle field and the East Panhandle field. The division line between these two fields is a line drawn north and south along the town of LeFors. The East Panhandle field consists of Wheeler County and the east portion of Gray County. There is inter-communication between all portions of both the gas and oil fields, evidenced by the fact that there was a uniform virgin pressure of 430 pounds throughout the oil and gas field. The sour gas area, that is, the area which produces gas contaminated with more than a trace of hydrogen sulphide, lies along the northern and western edges of the West Field. There is no sour gas found in the East Panhandle field. The sour gas area is a very narrow belt from its eastern extremity in western Gray County to the middle of Hutchinson County, here it broadens somewhat attaining a width of four or five miles in extreme western Hutchinson County and in eastern Moore County. The belt extends to the western limits of the field in Hartley County. The sour gas area lies between the oil fields on the northeast edge of the Panhandle field and the sweet gas area to the south.

10

There are no carbon black plants in the Panhandle field which were constructed to use sweet dry natural gas residue only. Consequently most of the gas residue which has been consumed by carbon black plants has come either from [fol. 140] casinghead or sour gas wells. Approximately .4 of gas residue consumed by carbon black plants comes from sour dry gas, .5 comes from casinghead gas, and only .1 comes from sweet dry gas. With the exception of the plant of General Atlas Carbon Company the carbon black plants in the Panhandle field all produce less than two pounds of car-

bon black per 1000 cubic feet of gas. The average yield of all plants in the field, with the exception of General Atlas Carbon Company plant, is 1.43 pounds per 100 cubic feet.

11

With the exception of General Atlas Carbon Company, the carbon black plants in the Panhandle field use a manufacturing process known as the channel process, which was first introduced in 1892. In the manufacture of carbon black by the channel process heat is necessary and required and gas is burned and in so doing no remainder thereof is saved for any other use. In this process natural gas is partly burned in an insufficient supply of air and a smoking and sooty flame results. This flame strikes an iron channel on which most of the carbon black deposits. The carbon black is scraped off this channel and drops into a screw conveyer. This process is the same process as was fully described in the case of Walls versus Midland Carbon Company, 254 U. S. 300. Either sweet or sour gas may be used in the production of carbon black and in such manufacturing process the gas is entirely used and there is no residue that can be devoted to any other useful purpose.

12

The carbon black industy has been nomadic, journeying from field to field in quest of a cheap and plentiful supply of gas. It has existed in the United States for over sixty years, moving generally westward, first in Pennsylvania, [fol. 141] then in West Virginia, then Louisiana, then Kentucky and latterly coming into Texas, Oklahoma, Utah, Montana and Wyoming. As the various states tightened their regulations by statutes and orders the industry moved on until now it is largely centered in the Panhandle field. At this time approximately 80 per cent of all the carbon black manufactured in the United States is manufactured in the Panhandle Field. Since the invention of the channel process in 1892 very few improvements have been made in the method of manufacturing carbon black. Probably as much as 30 pounds of carbon can be recovered from 1000 cubic feet of gas by other processes than the channel process. The product so obtained is coarser in texture, is not commonly known as carbon black, and not available for many of the uses to which the product of the channel

process, known as carbon black, may be put. The restriction upon the use of gas which may be consumed in the manufacture of carbon black may cause advancements in the industry which will recover a greater yield of carbon black than is obtained by the channel process, but up to the present time there is no indication that any methods have been commercially developed other than the channel process.

13

Carbon black has a wide range in its usefulness, it being used in the manufacture of printer's ink, automobile tires, rubber products, paint, varnish, typewriter ribbons, carbon paper, lacquers, stove polish, shoe polish, book-binder boards, crayons, golf balls, tarpaulins, insulating materials, cement, tiles and artificial stone. So far as known it can only be manufactured from natural gas.

14

There is enough sour gas in reserve in the Panhandle field to fulfill the world's requirements of carbon black for [fol. 142] many years to come. There is also a tremendous supply of casinghead gas in the Panhandle field. There is now available for use in the manufacture of carbon black sufficient allotments under the orders of the Railroad Commission of sour and casinghead gas to supply all the demands and needs of such plants with an excess of 100,000,000 cubic feet of casinghead gas over and above the demand of the carbon black plants.

15

Carbon black is worth about four cents per pound. From the gas before its ultimate burning in the manufacture of carbon black there is stripped a fraction of a gallon of gasoline per 1000 cubic feet which is worth from one to two cents. Sweet gas before being marketed for light and fuel is also stripped of its gasoline content and a recovery of a fraction of a gallon of gasoline per 1000 cubic feet worth from one to two cents is obtained. A producer of sweet gas, if he is able to market the same for light and fuel purposes, receives about three or four cents per 1000 cubic feet in the field. When such gas is delivered at the burner tips it sells for various greater amounts. The producers of gas who sell to the companies who strip it and burn it for carbon

black receive less than a cent per 1000 cubic feet. Sweet gas is available without treatment to remove any hydrogen sulphide content for light and fuel purposes, but sour gas cannot be so used without being subjected to treatment as the hydrogen sulphide content of such gas renders it unfit for light and fuel purposes. Such hydrogen sulphite content renders sour gas corrosive, thereby injuring the pipe lines, equipment, burners and other mechanical appliances through which it has to pass, in addition to its odor and detrimental effect upon the health of the persons adjacent [fol. 143] to it, when burning. These characteristics render sour gas undesirable for use for light and fuel purposes, the corrosive effect of such hydrogen sulphide content being particularly injurious to the pipe lines of light and fuel operators who transport gas for considerable distances to their respective light and fuel markets. From a purely economical standpoint, sweet gas can be more economically used in the manufacture of carbon black than sour gas for the reason that the hydrogen sulphide in sour gas has a deteriorating effect upon the carbon black plant, pipe lines and equipment.

16

The establishment of the line of distinction between sweet and sour gas at 1½ grains of hydrogen sulphide per 100 cubic feet is an apt point of division. In the Panhandle gas field there are approximately 800 gas wells producing natural gas containing no appreciable concentration of hydrogen sulphide; 80 to 90 wells producing gas containing the slightest trace and one grain of hydrogen sulphide per 100 cubic feet; only 7 or 8 wells producing gas containing between 1 and 2 grains of hydrogen sulphide per 100 cubic feet of gas and a great number of wells producing natural gas having a high hydrogen sulphide content (up to 300 grains per 100 cubic feet). If all gas containing the slightest trace or more of hydrogen sulphide were classified as sour gas a very appreciable volume of gas which could be taken into a pipe line without treatment would be used for carbon black manufacture. The point of differentiation of 1½ grains of hydrogen sulphide per 100 cubic feet increases the reserve of gas restricted to light and fuel purposes considerably without increasing the concentration of hydrogen sulphide in the pipe lines to a point where their life would

be shortened by corrosion or where the consumers will feel any disagreeable effects.

[fol. 144] 17

Casinghead gasoline plants and carbon black plants have generally been constructed on or along the sour gas line and north of said line in the sour gas or oil areas. Estimates of recoverable gas in the Panhandle field range from thirteen trillion cubic feet to 22 trillion cubic feet to 29 trillion cubic feet. The demand for sweet gas from the Panhandle field has continued to increase since 1932. The range of market for sweet gas for light and fuel purposes from the Panhandle field extends from Indianapolis, Indiana, to Cheyenne, Wyoming, and includes Chicago, Illinois; Minneapolis and St. Paul, Minnesota; Sioux Falls, South Dakota; Denver, Colorado; Wichita, Kansas; Hutchinson, Kansas; Kansas City, Missouri; Forth Worth, Dallas and Wichita Falls, Texas, and numerous other communities in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Minnesota, Iowa, Nebraska, South Dakota, Wyoming, New Mexico and Colorado. Approximately ten million people are dependent upon the supply of natural gas from the Panhandle field for light and fuel purposes.

Sweet gas in its natural state as defined by House Bill 266 is usable for carbon black and for light and fuel; sour gas in its natural state as defined by House Bill 266 is usable for carbon black but not usable for light and fuel. Each have substantially the same B. T. U. content and equal carbon black productivity, but sour gas must undergo treatment before it can be put into pipe lines for domestic and industrial use.

18

The complainant, The Henderson Company, produces both from wells located on properties on which it owns gas and oil leases and purchases production from other producers in the field. There are 21 gas wells connected to its [fol. 145] plant. Acting under authority of House Bill 266 the Railroad Commission has determined that 14 of the wells connected to the plant of The Henderson Company, complainant, are within the classification of sweet gas wells as defined in said act, leaving 7 wells which are classified as sour gas wells under the terms of the statute. There are

no unconnected sour gas wells in the vicinity of The Henderson Company's gasoline plant to which it can connect and utilize the same for gasoline and carbon black manufacture; that the only available sour gas area in the Panhandle field is located miles distant from the plant of The Henderson Company and in an area undeveloped which would require an expenditure on behalf of The Henderson Company in excess of $300,000.00 to acquire and develop the same in laying pipe lines thereto for the purpose of transporting the same to complainant's plant to meet its carbon black requirements. There is no market available to complainant, The Henderson Company, for the gas being produced from the 14 wells connected with its plant and classified as sweet gas wells for light and fuel purposes. That there is no immediately available market for sweet gas in the Panhandle field. That there is no market for sweet gas in the Panhandle field for the other purposes provided in said act for which sweet gas may be used: (a) chemical manufacturing, (b) introduction of gas into the oil and gas bearing horizon in order to maintain or increase the ultimate recovery of gas from such horizon. That in the opinion of witnesses it is wholly economically impractical, if possible, to return the residue gas after the extraction of gasoline content therefrom back into the horizon from which it is produced.

Under the provisions of House Bill 266 the complainant, The Henderson Company, can only supply the Combined Carbon Company with the production from such seven wells [fol. 146] after the extraction of the gasoline content from such gas in the gasoline plant of The Henderson Company, and the use of the gas from the fourteen wells which have been classified as sweet gas wells for the manufacture of carbon black is prohibited to it by the provisions of House Bill 266. Under House Bill 266 such seven wells, which have been classified as sour gas wells, cannot be produced in excess of 25% of their potentials. When produced at 25% of their potentials the production from such wells is insufficient to supply the requirements of the complainant, The Henderson Company. Under its contract with the Combined Carbon Company a portion of production from the fourteen wells connected to such plant which have been classified as sweet gas wells may be used to meet the fuel demands of such plant, which are approximately eight million cubic feet per day. The contract of complainant, The

Henderson Company, with the Combined Carbon Company provides that the complainant will sell to the Combined Carbon Company all of the stripped or residue gas now being produced or which may hereafter be produced at its gasoline plant as the Combined Carbon Company may be able to make use of or dispose of by sale to other parties for such period of time as the complainant, The Henderson Company, shall use and produce such gas at its said plant or extension or any addition thereto. The contracts for the purchase of gas by the complainant, The Henderson Company, by their terms and provisions apply to gas which may be lawfully used for the single and ultimate purpose of natural gasoline extraction.

[fol. 147] Conclusions of Law

1

This court has jurisdiction of this cause since the same arises under the Constitution and laws of the United States, and because there is a diversity of citizenship between the party complainant and the party defendants, and the value of the property or property rights in controversy is in excess of the sum of three thousand dollars, exclusive of interest and costs, and complainant seeks both by preliminary and permanent injunction to restrain the enforcement of a State Statute and order on the grounds of unconstitutionality under the Federal Constitution.

By article 17, section 59a, the Constitution of the State of Texas delegates to the Legislature the power to conserve the natural resources of the State of Texas; said section provides that the preservation and conservation of such natural resources are each and all hereby declared public rights and duties, and that gas constitutes one of its natural resources is now too well settled to admit of further controversy.

3

In Texas the principles of common ownership of oil and gas is not accepted and the theory or the doctrine of ownership of oil and gas in place has been established as a rule of property. The doctrine or rule of ownership of oil and gas in place does not militate against the enactment by the Legislature of the State of Texas of measures tending and having reasonable relationship to the conservation and

preservation of the natural resources of the State, and the rule of ownership of oil and gas in place is subject to the exercise by the Legislature of measures designed to affect this branch of the police power. The right or rule of cap- [fol. 148] ture doctrine under which the owner of land overlying oil or gas may withdraw oil or gas without liability to a neighbor whose gas may be withdrawn through his well bore also obtains in Texas. This right of capture, however, is also subject to the exercise of the police power of the State looking to the prevention of wasteful practices which not only destroy the natural resources of the State but impinge upon the rights of others in a common reservoir. The right of the Legislature to enact measures bringing about the conservation and preservation of natural resources of the State is not limited to the prevention of underground waste, but applies with equal effect to regulations looking to the prevention of surface waste and a wasteful utilization of oil and gas after it has been reduced to possession. These principles are well settled by numerous decisions in oil and gas producing jurisdictions. The escape into the air of residue gas after its gasoline content has been extracted bringing about the irretrievable loss of a large percentage of the heat content of such gas, the waste of natural gas through the operation of oil wells with inefficient gas-oil ratios, the production and operation of wells in such manner as to bring about or cause the loss or waste of gas may be prohibited. The same principles which have guided the courts in upholding measures seeking prohibition of such wasteful practices are likewise applicable to the exercise of the power of the State in prohibiting burning of sweet gas in the manufacture of carbon black, however useful that product may be to the commerce of the world.

4

The Legislature is vested with the discretion as to the measures which it may adopt in carrying out the authority [fol. 149] vested in it to conserve and preserve the natural resources of the State and where it has exercised its legislative judgment in the respect of what measures are proper and necessary, and the extent to which such measures shall be applied, the court cannot substitute its judgment for that of the Legislature, if such measures so adopted by the Legislature have a reasonable relation to the object sought

to be accomplished—the conservation of the natural resources. The legislative discretion has not been abused in this instance. We find an abundance of factual support for the legislative prohibition against the burning of sweet gas for carbon black set out in the provisions of House Bill 266 here under attack, and for that reason the conclusion that such provisions have and bear a reasonable relation to the conservation of the natural resources of the State.

5

House Bill 266 in so far as the same classifies the uses to which sweet and sour gas may be put and in its definition of sour gas contains no unreasonable classifications. Such act operates equally upon all persons within the classifications, and rests upon reasonable bases and has support under the facts which have been developed in this case. Numerous bases exist for the classification between sour and sweet gas and the uses to which such gases may be put. As a matter of marshel-ing the natural resources of the State the Legislature has the power when one resource is fitted for two uses and another resource for only one use to classify these natural resources as to the use to be made of them, both for the purpose of preventing waste and for the protection of correlative rights, valid and substantial differences exist between the subjects here classified by the Legislature.

[fol. 150] 6

The act here under attack in defining sour and sweet gas and in prohibiting the use of sweet gas for the manufacture of carbon black does not completely outlaw or destroy the carbon black industry, but on the other hand devotes to it an enormous supply of gas reserve. The court is unable to find that the legislative classifications are arbitrary, unreasonable and without substantial bases of fact.

7

The subject of legislative action in this instance being one within the proper and legitimate scope of legislative action and the object sought to be accomplished by the legislature having a reasonable relation to such subject and being within the proper sphere of the police power of the State, the incidental effect of such legislation and orders

of the Railroad Commission promulgated pursuant thereto upon the property or contracts of the complainant affords no basis for relief to the complainant.

8

These conclusions find no obstacle in the provisions of the Constitution of the State of Texas, which except out of the general powers of government the Bill of Rights contained in such instrument, which Bill of Rights inhibits any law impairing the obligation of contracts and the taking of property without compensation. Manifestly the operation of the statute upon the contracts of the complainant is indirect and incidental. The provisions of the statute under attack here do not seek to directly impair the contracts of the complainant such as in moratorium or like statutes, the effect of which is to directly impair obligations. [fol. 151] The effect of such provisions as to the contracts and property of complainant is an indirect abrogation flowing incidentally from a valid exercise of the police power. Such provisions are true waste measures, bearing a relationship to the conservation of the natural resources of the State of Texas, and accordingly are not unconstitutional as applied to complainant.

(Signed) J. C. Hutcheson, Jr., United States Circuit Judge. (Signed) Robert J. McMillan, United States District Judge. (Signed) T. M. Kennerly, United States District Judge.

[File endorsement omitted.]

[fol. 152] In United States District Court

[Title omitted]

Petition for Allowance of Appeal and Order Allowing Appeal—Filed June 23, 1936

To the Honorable Court Aforesaid:

Now comes The Henderson Company, complainant in the above entitled and numbered cause, and respectfully represents and shows that in said cause pending in said court the complainant requested and pressed to a hearing its ap-

plication for interlocutory injunction against the defendants in said cause, towit: Ernest O. Thompson, C. V. Terrell and Lon A. Smith, constituting the Railroad Commission of the State of Texas, and William McCraw, Attorney General of Texas, seeking to restrain said defendants from enforcing as against complainant, Chapter 120, Acts of the Forty Fourth Legislature of Texas, Regular Session, and certain orders of the Railroad Commission issued pursuant thereto, which are fully described and set out in the original Bill of Complaint and amendment thereto, filed by complainant in said cause and which said application for temporary injunction was heard by three judges in accordance with Section 380, Title 28, U. S. C. A. (Judicial Code, Section 266, amended), and said application for interlocutory injunction was denied by said court as so constituted; [fol. 153] and, thereafter, the complainant requested and pressed to a hearing its further application for a permanent injunction to restrain said defendants from enforcing as against complainant certain provisions of said statute and certain orders of the Railroad Commission of Texas, which are fully set out and described in complainant's original Bill of Complaint and amendment thereto, filed herein, and which said application for permanent injunction was heard by a three judge court in accordance with said section 380; and, thereafter, decree of said court, denying complainant the relief sought and prayed for, in its Original Bill of Complaint and amendment thereto, was duly entered by the court, the date of the entry of such decree being March 31, 1936, which decree is greatly to the prejudice and injury of petitioner, complainant herein, and is erroneous and inequitable,

Wherefore, in order that your petitioner may obtain relief in the premises, and for the opportunity to show the errors complained of which are specified and set forth in the Assignment of Errors filed contemporaneously herewith, your petitioner prays that it be allowed an appeal in said cause to the Supreme Court of the United States, sitting in Washington, and that citation issue and a transcript of the record, proceedings and papers upon which said decree is based, duly authenticated, be sent to the Supreme Court of the United States agreeably to the Statutes and Rules of the Court in such cases made and provided.

Your petitioner further prays that proper order be made fixing the amount of the bond for costs which petitioner must give and furnish in connection with such appeal.

Petitioner submits and files herewith its Assignment of Errors upon said judgment and decree.

[fol. 154] Dated this 23 day of June, 1936.

(Signed) L. M. Fischer, F. W. Fischer, Attorneys for Complainant, The Henderson Company.

The above petition is hereby granted and the appeal allowed, and bond upon appeal is hereby fixed at $1,000.00, said bond to be made payable, jointly and severally, to the defendants, Ernest O. Thompson, C. V. Terrell and Lon A. Smith, constituting the Railroad Commission of Texas, and William McCraw, Attorney General of Texas, and to be conditioned as required by law, to be approved by the Court.

Witness my hand, this 23rd day of June, 1936.

(Signed) Robert J. McMillan, United States District Judge.

[File endorsement omitted.]

[fol. 155] In United States District Court

[Title omitted]

Assignment of Errors—Filed June 23, 1936

Comes The Henderson Company, complainant in the above entitled cause, and in compliance with Rule No. 9 of the Rules of the Supreme Court of the United States, and assigns the following errors committed by the District Court of the United States for the Western District of Texas, Austin Division, in the trial of the above cause, and the judgment and decree entered therein, as shown in the record and proceedings in said cause:

I

The Court erred in entering its judgment and decree in this cause denying and refusing complainant's application

[fol. 156] and prayer for permanent injunction against the defendants and taxing the costs against complainant.

II

The Court erred in holding that the provisions of the statute complained of bear a reasonable relationship to the prevention of waste and conservation of the natural resources of the State of Texas, and constitute no unreasonable interference with or confiscation of complainant's property.

III

The Court erred in holding that the provisions of the statute complained of do not unlawfully discriminate between the owners of sweet and sour gas, and that the definition and classification of sweet and sour gas and the specified uses therefor as contained in said statute are based upon fact foundation and are accordingly valid.

IV

The court erred in holding that the operation of the statute as to complainant and its property does not impair the obligation of complainant's contract with Combined Carbon Company and various owners of leases with whom [fol. 157] complainant is under contract to take gas from their wells, and that the enforcement of said statute is not in violation of Article I, Section 16 of the Constitution of the State of Texas.

V

The Court erred in not holding that the purported finding of the Legislature of Texas, to the effect that the utilization of sweet gas for the manufacture of carbon black constitutes waste, is binding upon the Court and that the Court cannot subssitute its judgment, conscience and discretion for the judgment, conscience and discretion of the Legislature, when as a matter of fact there is no physical waste of gas when the same is utilized for the manufacture of carbon black, and there was no reasonable fact basis for the legislative prohibition of the use of sweet gas for the manufacture of carbon black.

VI

The Court erred in holding that the State of Texas, in the conservation of its natural resources, has the power to consider the uses to which those resources are most appropriately adapted and dedicate sweet gas for the restricted use of light and fuel purposes, and prohibit the use of [fol. 158] such gas for the manufacture of carbon black, although the result thereof may destroy complainant's properties, where the record conclusively establishes that there is no physical waste of gas in the utilization of the same for the manufacture of carbon black in the plant of Combined Carbon Company, with whom complainant is under contract to furnish its requirements.

VII

The Court erred in failing to differentiate this case from the case of Walls v. Midland Carbon Company, 254 U. S. 300, and in citing said case of Walls v. Midland Carbon Company as authority for its decision in this case, for the following reasons: (a) That the rule of property in Texas is different from the rule of property in Wyoming. (b) That the facts in this case are entirely different from the facts in the case of Walls v. Midland Carbon Company.

VIII

The Court erred in holding that the legislative classification of and distinction between sweet and sour gas is valid, when as a matter of fact there is no basic difference between sweet and sour gas, their B.T.U. content and carbon black productivity being the same, and that such provisions of the statute in their application to the Panhandle gas field, where complainant's properties are located, under the record in this case, bear no reasonable relation to the provisions sought to be accomplished thereby, and said classification is therefore discriminatory against complainant and its properties.

IX

The Court erred in holding that the use of sweet gas for the manufacture of carbon black constitutes waste when, as a matter of fact, under the record in this case it is predominately established that there is no physical waste

[fol 159] of gas where the same is used in the manufacture of carbon black.

X

The Court erred in holding that the use of sweet gas for the manufacture of carbon black constitutes waste, although the very statute under attack authorizes the utilization of sour gas for the manufacture of carbon black, and under the record in this case there is no basic difference between sweet and sour gas, as produced in the Panhandle field where the properties of complainant are located.

XI

The Court erred in denying and refusing complainant's application and prayer for injunction, for the reason that in Texas the Legislature has authority under its police power, or by virtue of Article 17, Section 59a of the Constitution of Texas, to regulate the production and use of the natural resources of the state only to the extent to prevent physical waste thereof, and under the record in this case it is conclusively established that there is no physical waste of gas, either underground or overground, in complainant's operation, and that the complained of provisions of said statute and the orders of the Railroad Commission promulgated thereunder, have no reasonable relation to the purposes sought to be accomplished thereby, but the same are purely arbitrary and their enforcement would be an unreasonable interference with complainant's property and property rights, and violative of the Fourteenth Amendment to the Constitution of the United States.

XII

The Court erred in not holding that the enforcement of the provisions of said statute complained of, and the orders of the Railroad Commission promulgated thereunder against complainant and its properties, will not only deny to complainant the right to reasonably use its said property [fol. 160] for lawful purposes, without physical waste thereof, but will absolutely destroy such property, in that such act and order dedicates the same to a use for which there is no outlet or market afforded to complainant, and thus the same amounts to the taking of complainant's property without due process, in violation of the Fourteenth Amendment to the Federal Constitution.

XIII

The Court erred in not holding that the enforcement of the provisions of said statute, and the orders of the Railroad Commission against complainant and its property, will discriminate between complainant and others of the same class and similarly situated, in that it denies to complainant the right to use its said property for the manufacture of carbon black, whereas it permits complainant's neighbors, engaged in the same character of business, to use the same character of property for the manufacture of carbon black and takes and appropriates complainant's property for a specific and restricted use and for which complainant is denied any outlet, and thus complainant is denied the equal protection of the law as guaranteed by the Fourteenth Amendment to the Constitution of the United States.

XIV

The Court erred in not holding that the provisions of said statute, and the orders of the Railroad Commission authorizing the use of sweet gas for fuel purposes, discriminates against complainant and its said properties in favor of others who are permitted, under said statute and orders, to use gas for fuel purposes, whatever the necessity for such use may be, in that it denies the use of sweet gas for the manufacture of carbon black, when as a matter of fact conclusively established by the record all the heat units contained in such gas are actually utilized and applied in such manufacture for the purpose of generating heat in order to break down the chemical constituents of said gas [fol. 161] and separate the carbon black from the other elements contained therein.

XV

The Court erred in not finding as a fact, in its Findings of Fact filed herein, that the Panhandle gas field where the properties of complainant are situated is underlaid by one common or single reservoir and that there is no structural barrier between the sweet and sour areas in said reservoir, and that gas migrates from one portion of the field to the other, depending upon the pressure condition existing in the reservoir, and that gas withdrawn from any portion of said reservoir will affect the ultimate recovery of gas from

the balance of said reservoir, and that as far as the total ultimate recovery of gas from said reservoir is concerned it is immaterial from which portion of the field the same is produced; that the average pressure now prevailing in the sour gas area is 94 pounds lower than the average pressure prevailing in the sweet gas area; that gas is now and has been migrating from the sweet gas area of higher pressure to the sour gas area of lower pressure, and will continue to do so until the pressure differentials in the two areas are equalized; that as a result of this migration the sour gas area is becoming constricted and the sour gas line is moving farther north and east; that if the statute complained of be enforced and the sour gas area be permitted to produce to the extent of its market demands, and the sweet gas area be permitted to produce to the extent of its market demands, the respective market demands for light and fuel and for carbon black manufacture being approximately equal, the effect will be that the sour gas area will be permitted to produce at a rate in proportion to its total open flow or capacity to produce, of the wells now located in said area, approximately four times greater than the rate of production in the sweet gas area at the total open flow or capacity [fol. 162] to produce of the wells located in the sweet gas area, which will result in creating a greater differential in the pressure between the sweet and the sour areas and will cause a greater degree of migration of sweet gas into the sour area and cause the sour area to be further constricted, and in time the sour area will cease to exist; that already heretofore there has been a tremendous migration of sweet gas into the sour area, which sweet gas is now being produced from the sour gas wells in the sour area, and is now being used in the manufacture of carbon black, and that this condition will continue in the future.

XVI

The Court erred in not finding as a fact in its Findings of Fact in this cause that there is no physical waste of gas utilized by complainant in its operations for the manufacture of natural gasoline and carbon black; that gas is received by complainant in the pipe lines from the various wells connected with its plant, where such gas is processed and all the natural gasoline contained therein is extracted and the residue delivered in pipe lines connected to the

carbon black plant of Combined Carbon Company, where such gas is utilized by said company in the manufacture of carbon black; that in such process there is no actual physical waste of gas into the air. That complainant's gasoline plant is constructed of the most efficient equipment and that such plant employs the latest and best approved methods for the recovery of the gasoline contained in the gas, and that likewise Combined Carbon Company's plant is constructed of the latest and most efficient equipment and it employs the most approved and efficient process known to the carbon black industry for the recovery of the greatest amount of carbon black from natural gas, which will meet the requirements and specifications of the users of such product.

[fol. 163]

XVII

The Court erred in not finding as a fact in its Findings of Fact filed herein, that the actual recovery of Combined Carbon Company of carbon black from each 1000 cubic feet of gas, which will meet the specifications and requirements of the users of such product, is approximately 1 and 1/2 pounds; that 1000 cubic feet of gas in the Panhandle field, theoretically, contains approximately 30 pounds of total carbon. However, the element carbon and the product called carbon black are in nowise similar but are vastly different products and may be compared to iron ore in its original state from which high grade steel is manufactured; that there are a few other processes known which are yet in the experimental stage which recover element carbon (not carbon black) from natural gas in excess of 1 and 1/2 pounds but the product manufactured in these processes is not carbon black, does not meet the requirements and specifications of the users of carbon black and cannot be used in the manufacture of articles where carbon black is a necessary ingredient. That if it were possible to recover the total amount of element carbon contained in 1000 cubic feet of gas, such product likewise would not be carbon black and would have no utility or commercial value whatever. That there is no actual physical escape of gas in the manufacture of carbon black, as all of the gas is utilized and consumed in such manufacture and only an infinitesimal quantity of carbon black goes into the air from the burner houses, which is impractical of recovery; that

in the manufacture of carbon black heat is necessary and required, and all of the heat units contained in the gas utilized for the manufacture of carbon black in the process employed by the Combined Carbon Company are actually utilized and applied to break down the chemical constituents in the gas and separate the carbon black from the other elements contained therein.

[fol. 164]

XVIII

The Court erred in making the following finding of fact contained in Paragraph 12 of the Findings of Fact filed herein: "Probably as much as 30 pounds of carbon can be recovered from 1000 cubic feet of gas by other processes than the channel process", for the reason that such finding is not supported by the evidence.

XIX

The Court erred in arriving at the following conclusion in paragraph 4 of its Conclusions of Law filed herein, as follows: "We find an abundance of factual support for the legislative prohibition against the burning of sweet gas for carbon black set out in House Bill 266, here under attack, and for that reason reach the conclusion that such provisions have and bear a reasonable relation to the conservation of the natural resources of the state", for the reason that the record in this case conclusively establishes that in the manufacture of carbon black there is no physical waste of gas and that there was no basis of fact for such legislative prohibition, and the provisions of the statute under attack are therefore arbitrary, unreasonable and their enforcement would constitute an unreasonable interference with the rights of private property.

XX

The Court erred in its conclusion of law contained in Paragraph 5 of its Conclusions of Law filed herein, that: "As a matter of marshalling the natural resources of the state the Legislature has the power, when one resource is fitted for two uses, and another resource for only one use, to classify these natural resources as to the use to be made of them, both for the purpose of preventing waste and for the protection of correlative rights", for the reason that [fol. 165] in Texas the Legislature is powerless, whether acting under its police power or under Article 17, Section

59a, to pass any law attempting to regulate the production and use of gas solely for the protection of correlative rights and irrespective of preventing physical waste.

XXI

The Court erred in its Conclusions of Law from the facts as found by the Court as set out in its Findings of Fact and Conclusions of Law filed by the Court in this cause, for the reason that the facts found by the Court do not afford a basis for the Conclusions of Law made.

XXII

The Court erred in upholding the validity of the provisions of the statute under attack for the reason that such provisions of such statute are not severable from the proratable production provisions of said statute, but each is dependent upon the other, and particularly the provisions of such statute under attack in this cause are dependent upon the proratable production provisions of said statute, and the Court has heretofore declared that the proratable production provisions of said statute are invalid, the invalidity of which necessarily carries with it the invalidity of the provisions of said statute here under attack.

For which errors above set out, complainant prays that the judgment and decree of the District Court of the United States for the Western District of Texas, dated March 31, 1936, in the above entitled cause, be reversed and a judgment rendered in favor of complainant as prayed for in its Bill of Complaint, and for costs.

(Signed) L. M. Fischer, F. W. Fischer, Attorneys for Complainant, The Henderson Company.

[fol. 166] [File endorsement omitted.]

[fols. 167-213] Bond on appeal for $1,000.00 approved and filed June 25, 1936 omitted in printing.

[fol. 214] In United States District Court

[Title omitted]

Waiver of Citation and Notice—Filed June 23, 1936

Now come Ernest O. Thompson, C. V. Terrell and Lon A. Smith, constituting the Railroad Commission of Texas,

and William McCraw, Attorney General of Texas, defendants in the above numbered and entitled cause, by their attorneys and solicitors of record, and do hereby waive issuance and service of citation and notice of appeal, as required by law, and hereby agree that complainant shall have the full forty days from date hereof as provided by Rule 10 of the Rules of the Supreme Court within which to file the record and docket the cause with the Clerk of the Supreme Court, and further agree that the Court may extend much time as provided by Rule 11 of the Rules of the Supreme Court without further notice to the defendants; and the defendants do hereby enter their voluntary appearance in the appeal to the Supreme Court of the United States, at Washington, D. C.

Dated, this 23rd day of June, 1936.

(Signed) Ernest O. Thompson, C. V. Terrell, Lon A. Smith, Constituting the Railroad Commission of Texas, by Wm. Madden Hill, Assistant Attorney General of Texas, Their Attorney and Solicitor of Record. (Signed) Wm. McCraw, Attorney General of Texas.

[fol. 215] [File endorsement omitted.]

[fol. 216] In United States District Court for the Western District of Texas, Austin Division

No. 535. In Equity

The Henderson Company, Complainant,

versus

Ernest O. Thompson et al., Defendants

Statement of Evidence under Equity Rule 75—Filed August 4, 1936

Preliminary Statement

Be It Remembered, that on the 28th day of February, 1936, the above entitled cause came on regularly for trial before the above Court, constituted in accordance with Section 266, Judicial Code, with Honorable Joseph C. Hutche-

son, Jr., Circuit Judge, and Honorable T M. Kennerly and Honorable Robert J. McMillan, District Judges, sitting; whereupon the following appearances were entered for the complainant, F. W. Fischer, L. M. Fischer, Amarillo, Texas.

For the respondents: William McCraw, Attorney General of Texas, William Madden Hill, Assistant Attorney General of Texas, C. C. Small, Special Counsel.

The following together with certain exhibits to be forwarded is a condensed statement of the evidence, which is considered essential to the decision of the question presented by the counsel, in which the testimony of the witnesses is stated in narrative form, except in a few instances in which part of the testimony has been reproduced in the exact words of the witnesses.

Complainant's Case

[fol. 217] F. C. HALL testified as follows:

That he is 49 years of age and resides at Amarillo, Texas; that he is secretary and general manager of The Henderson Company, a Maine corporation, which company is permitted to do business in Texas, and maintains offices at Amarillo, Texas; that he has been connected with such company and in such capacity for 18 years; that during the time that F. C. Henderson, Inc. was in existence he was likewise secretary and general manager of such corporation; that on or about September 1, 1934, The Henderson Company acquired all of the capital stock and assets of F. C. Henderson, Inc., and the charter of the latter company has been surrendered.

That The Henderson Company owns and operates a casing head gasoline manufacturing plant at Sanford, Texas; that such plant was built and constructed by F. C. Henderson, Inc., in the year of 1929, at an initial cost of approximately $350,000.00; that thereafter the same was enlarged and additions made thereto, including gathering pipe lines and other property, by said F. C. Henderson, Inc. and The Henderson Company, until the total investment in said plant and property connected therewith exceeds the sum of $500,000.00. That said F. C. Henderson, Inc. began processing gas in said plant in the fall of 1929, from various leases in the Sanford territory, covering which said F. C.

Henderson, Inc. acquired casinghead gas contracts. All of such casinghead gas contracts originally entered into by F. C. Henderson, Inc., or F. C. Henderson acting for [fol. 218] said corporation, are now owned and held by The Henderson Company. That since said time, The Henderson Company has acquired additional casinghead gas contracts on additional leases in the Sanford area, and has acquired by purchase certain oil and gas leases, and prior to August 1, 1935, The Henderson Company was connected with and processing gas from twenty-one wells; that the nature of the operation of the plant of The Henderson Company at Sanford, Texas, is to extract the gasoline content contained in the gas furnished to such plant, and in this connection affiant says that the gas contained in the Panhandle reservoir contains an average of approximately .35 of a gallon of gasoline to every thousand cubic feet of gas; that in the various oil pools located in the Panhandle reservoir, where the gas comes in immediate contact with the oil, the gasoline content is higher; that at the time said gasoline extraction plant was built, the Sanford area and all of the leases under contract with F. C. Henderson, Inc., and from which said plant was receiving gas, were well within the then known sour gas area and that the hydrogen sulphide content in the gas produced from such leases under contract to furnish gas to said plant ranged from 18 to 35 grains per hundred cubic feet of gas. That under the terms and provisions of said casinghead gas contracts entered into between F. C. Henderson, Inc., and various lease owners in the Sanford area, which contracts are now owned by The Henderson Company, F. C. Henderson, Inc. agreed to purchase and accept all gas capable of being pro- [fol. 219] duced from such leases, provided it should not be required to take more than a daily average of 25 per cent of the open flow from the wells on such leases. A copy of the usual and uniform casinghead gas contract, which F. C. Henderson, Inc. made with the various lease owners now under contract to deliver gas to said plant, and which contracts are now owned by The Henderson Company, is hereto attached; that the other casinghead gas contracts now owned by The Henderson Company contain substantially similar provisions. That at the time said plant began operations there was no market or outlet for the residue from such gas, after the extraction of the gasoline con-

tent therefrom, and in truth and in fact there was no market for such gas in said territory for any purpose, save and except for the extraction of the gasoline content therein contained, to the plant of The Henderson Company or other companies owning and operating similar casinghead extraction plants.

That in the order of the Railroad Commission dated July 20, 1935, and as amended August 1, 1935 and August 5, 1935, fourteen wells connected with the plant of The Henderson Company, and located on eleven different leases which are either under contract with The Henderson Company to furnish it gas for processing in said plant, or owned outright by The Henderson Company, as hereafter will be pointed out, have been classified as sweet gas wells, in pursuance to the provisions of House Bill 266, which wells and the leases upon which the same are located, are described as follows, towit:

[fol. 220] The North Half (N. ½) of the South 160 acres of Section 81, Block 46, H&TC Ry. Co. Survey, known as the Deal Lease	1 well.
A 189½ acre tract of land lying along the South side of Sections 85, 86 and 87, known as the J. C. Whittenburg Survey No. 1, Block OB	2 wells.
The South Half (S. ½) of the South Half (S. ½) of the North Half (N. ½) of Section 85, Block 46, H&TC Ry. Co. Survey, known as the North American Lease	1 well.
The South 320 acres of the North 450 acres of Section 86, Block 46, H&TC Ry. Co. Survey, known as the North American Shell Lease	1 well.
The Southwest Quarter (SW. ¼) of the West Half (W. ½) of the North 80 acres of the South 320 acres of Section 83, Block 46, H&TC Ry. Co. Survey, known as the Polo Oil Company Lease	1 well.
The North Half (N. ½) and the Southeast Quarter (SE. ¼) of the Northwest Quarter (NW. ¼) of the North Half (N. ½) of the South 320 acres of Section 83, Block 46, H&TC Ry. Co. Survey, known as the Reliance Development Company Lease	1 well.
The North Half (N. ½) of the South 160 acres of [fol. 221] Section 83, Block 46, H&TC Ry. Co.	

Survey, known as the Texorado Oil & Gas Company Lease	2 wells.
The North 160 acres of the South 240 acres of the North 400 acres of Section 87, Block 46, H&TC Ry. Co. Survey, known as the Great Plains Lease	1 well.
Survey 1 SF 12952, D. Rubin Grantee	1 well.
Survey 5 SF 12956, D. Rubin Grantee	2 wells.
The North 80 acres of the J. T. Williams Survey No. 1, Certificate No. 1233, known as the Underwood, et al Lease	1 well.

That of the leases above described, The Henderson Company owns outright the following:

The J. C. Whittenburg Survey No. 1;

The North-American Lease in Section 85, Block 46, and The Great Plains Lease, which leases were acquired during the year 1933; that upon all of the other leases above described The Henderson Company holds casinghead gas contracts similar to the contract, copy of which is hereto attached, under the terms of which it is required to take [fol. 222] and receive the gas capable of being produced from such leases. That the casinghead gas contracts covering the leases above described and designated as the North American-Shell Lease; Survey No. 1, D. Rubin Grantee; Survey No. 5, D. Rubin Grantee, and the Underwood, et al, Lease, were all acquired during the year 1933.

That the gas capable of being produced from the wells located on all of said leases above described contains varying degrees of hydrogen sulphide, but under the test made by the Railroad Commission of Texas in July, 1935, such hydrogen sulphide content is now less than one and one-half grains per hundred cubic feet.

That according to the tests of the Railroad Commission, made in July, 1935, the total daily open flow of all the twenty-one wells connected with the plant of The Henderson Company and under contract with it to furnish gas to said plant, is 362,747,000 cubic feet; that the total daily open flow of the fourteen wells above described, so classified by the Railroad Commission as sweet wells, is 231,042,000 cubic feet.

Affiant further states that The Henderson Company, on October 9, 1934, made and entered into a contract with the Combined Carbon Company, under the terms of which Com-

bined Carbon Company agreed to build and construct a carbon black manufacturing plant in the vicinity of the Henderson Company's gasoline plant, of sufficient size and quantity to produce 10,000,000 pounds of carbon black per [fol. 223] year, and The Henderson Company agreed to furnish to Combined Carbon Company its full gas requirements, after the extraction of the gasoline content therefrom, for the purpose of manufacturing such carbon black, for a period of ten years. A copy of said contract is hereto attached and made a part hereof. That in pursuance to such contract, Combined Carbon Company immediately thereafter commenced the construction of a carbon black plant near Sanford, Texas, and has completed to date four units of said plant, with a capacity of approximately 30,000,000 cubic feet of gas per day, at an approximate cost of $750,000.00, and since May 1, 1935, The Henderson Company has been furnishing residue gas to said Combined Carbon Company, and the same is being used by said carbon company in its said plant for the manufacture of carbon black. That during the month of July, 1935, said carbon plant actually utilized a daily average of 27,426,000 cubic feet of gas, and affiant is informed that its future requirements will be to the extent of its capacity of 30,000,000 cubic feet per day.

That the future requirements of said plant, as now constructed, are approximately 30,000,000 cubic feet of gas per day, and the additional requirements of said plant will be in proportion to the future enlargements of said plant; that The Henderson Company expended approximately $180,000.00 in acquiring gas contracts, leases, and drilling wells covering part of the properties above described, which have been classified by the Railroad Commission as sweet, and laying pipe lines thereto, for the purpose of building up its gas reserves so that it might make said contract with [fol. 224] Combined Carbon Company or some other carbon company; that The Combined Carbon Company entered into said contract with The Henderson Company on the faith and credit of the gas reserves belonging to The Henderson Company and the right of The Henderson Company to receive gas from said leases under contract with it, including those above described.

That since August 1, 1935, The Henderson Company has not taken and received any gas from the wells located on

said leases above described, for the purpose of processing such gas in extracting the gasoline content therefrom and delivering the residue thereof to Combined Carbon Company, and The Henderson Company has been compelled to curtail its operation to 25 per cent of the open flow of its remaining seven wells, which have been classified by the Railroad Commission as sour gas wells. That the full 25 per cent of the daily open flow from said seven wells from which The Henderson Company is permitted to utilize the gas for the extraction of the gasoline content therefrom, and the utilization of the residue thereof for carbon black manufacture, under House Bill 266 and orders of the Railroad Commission, is 32,924,000 cubic feet. That the gasoline content in said gas composes approximately 5 per cent of its volume, leaving approximately 31,277,800 cubic feet of residue remaining after the extraction of the gasoline content.

That in addition to the obligation of The Henderson Company to furnish 30,000,000 cubic feet daily to Combined Carbon Company, The Henderson Company requires ap- [fol. 225] proximately 8,000,000 cubic feet daily for its operations. That under its casinghead gas contracts it does not have the right to take gas from the wells covered thereby purely for plant operations. Therefore, if the provisions of House Bill 266 and the order of the Railroad Commission entered thereunder on July 20, 1935 and as amended on August 1 and August 5, 1935, be enforced against The Henderson Company, it will deny to The Henderson Company the right to receive any gas under said casinghead gas contracts from said fourteen wells above described, leaving The Henderson Company only 31,277,800 cubic feet per day at the full rate of 25 per cent of the open flow of its remaining sour wells to supply its residue carbon black requirement of 30,000,000 cubic feet per day and its operation requirements of approximately 8,000,000 cubic feet per day, which will be insufficient to the extent of approximately 7,000,000 cubic feet per day.

That the continual withdrawal of gas from the Panhandle Reservoir will constantly decrease the pressure in said reservoir and as such pressure is decreased the open flow of the gas from the wells in said reservoir likewise will decrease, and it is an absolute certainty that the open flow or capacity to produce of the remaining seven

wells connected with The Henderson Company's plant, from which it is authorized under the provisions of said act to process gas in its said plant, will in the future constantly diminish, and likewise, the amount of the allowable [fol. 226] that The Henderson Company will be permitted to run from said wells in the future will correspondingly decrease and The Henderson Company will not have anywhere near sufficient amount of gas to supply its residue requirements, irrespective of its requirements for plant operations. In addition to this, the constant migration of the sweet gas into sour, which is now taking place in said West Panhandle field, in a short time will convert the remaining seven wells connected with The Henderson Company plant into sweet gas wells, and if said act be enforced against The Henderson Company it will be absolutely denied the right to take any gas from any of the wells connected with its said plant at the present time, under its said casinghead gas contracts, and to utilize the residue thereof for the manufacture of carbon black, with the result that practically its entire investment will be lost, including its carbon black contract.

Affiant further states that there are no other sour gas wells in the Sanford area, or in the vicinity of The Henderson Company's plant, with which The Henderson Company can make connection and obtain gas therefrom for the purpose of supplying its carbon black market; that it has always heretofore offered, and does now offer, to make connection with well owners desiring to sell gas, but there are none in the Sanford area without connections and markets; that the only remaining sour gas areas in said field are non-producing and undrilled, and located miles distant from The Henderson Company's plant, which would re- [fol. 227] quire an expenditure of at least $200,000.00 in lease purchases, development and pipe lines, to acquire and operate in order to supply the present market requirements of The Henderson Company. That the only available wells in the Sanford area that The Henderson Company can look to, to supply its market requirements, are the wells now owned by it and under contract with it, including said fourteen wells so classified by the Railroad Commission as sweet gas wells, above described.

Affiant further states that the denial to The Henderson Company of the right to use gas from said fourteen wells so classified by the Railroad Commission as sweet gas wells, in its gasoline plant for the purpose of extracting the gasoline content therefrom and for utilizing the residue thereof for carbon black manufacture, has greatly impaired and placed in jeopardy the contract between The Henderson Company and the Combined Carbon Company, in that the major portion of the reserves of The Henderson Company, upon which said contract was based has become totally lost and the remaining wells under contract with The Henderson Company and classified as sour wells cannot produce sufficient gas, even at the full allowable of 25 per cent of their open flow, to furnish the necessary requirements of the Combined Carbon Company, and the Combined Carbon Company is threatening to cancel its said contract with The Henderson Company and to look elsewhere for its gas requirements, unless The Henderson Company is permitted to utilize the gas capable of being [fol. 228] produced from said wells above described, or unless The Henderson Company, at prohibitive cost, rehabilitates its reserves to the extent that the same have been depleted by the classification as sweet gas by the Railroad Commission.

That The Henderson Company does not propose to pop any gas in the air but only desires to be accorded the right to take ratably from its wells and those under contract with it a sufficient amount of gas to supply the carbon black requirements and plant operation. And, in this connection, affiant says that there is no physical waste of gas being processed in its said plant at Sanford, Texas, for the extraction of the gasoline content therefrom and the delivery of the residue thereof to the Combined Carbon Company for the manufacture of carbon black. That the plant of The Henderson Company has been constructed with the most modern machinery known to the gasoline industry and that the latest, most modern and approved methods are employed in such extraction process in its said plant, and that the plant of the Combined Carbon Company has been constructed with the most up-to-date and modern machinery for manufacturing carbon black and that the latest approved methods and processes for such manufacture are employed by the Combined Carbon

Company; that there is no physical waste of gas in such operation, from the time that the same is produced at the well to the time that the residue is consumed in the manufacture of carbon black. That the wells to which The Henderson plant are connected are capped to prevent the escape of such gas into the air; that such gas is trans-
[fol. 229] ported through pipe lines from the well openings to the plant of The Henderson Company and there it is run through absorbers and the gasoline content extracted, and from there it goes into the residue pipe line and is transported to the plant of the Combined Carbon Company.

Affiant further states that there is not now, and has never been, a general or open market in the Panhandle for gas for light and fuel purposes; that the light and fuel market is dominated and controlled by several large pipe line companies who have acquired markets in foreign states, purchased their own gas reserves, drilled their own wells, built their own pipe lines and who are serving their own markets with their own gas; that these pipe line companies in the past have consistently refused to purchase gas from other owners and producers of gas, and particularly have such pipe line companies refused to purchase gas containing hydrogen sulphide; that since July 20, 1935, affiant has interviewed representatives of all the pipe line companies in the West Panhandle field, which constitute the sole market for light and fuel purposes in said field, and each and all of said representatives of said pipe line companies have informed affiant that they have made no plans to purchase gas generally from other producers and have had no instructions to do so; and none of said pipe line companies has offered to purchase any gas from any of the leases belonging to The Henderson Company, or upon which The Henderson Company holds casinghead gas contracts.

[fol. 230] Affiant further states that he has made extended investigation as to the feasibility and practicability of re-introducing into the gas formation residue gas from the plant of The Henderson Company, and that from this investigation and study affiant says that the re-introduction of gas into the same horizon from which it is produced in the West Panhandle field, after extracting the gasoline content therefrom, would be utterly unfeasible and im-

practical, and that the cost of doing so would make such operation economically impossible, for the reason that the cost of re introduction would exceed the revenue derived from the sale of the gasoline content extracted; that regardless of the cost, such operation would soon result in a demuding of the gas of its gasoline content and the value of the gasoline content would soon diminish to a point where it would not be even profitable to operate a gasoline plant for this purpose.

Affiant further states that there is no fact justification for the provisions of said act prohibiting the use of sweet gas for the manufacture of casinghead gasoline, after August 1, 1935, and at the same time permitting sour gas to be processed for its gasoline content, irrespective of the utilization of the residue thereof until October 1, 1935; that as a matter of fact there are more sweet gas wells in the Panhandle field without pipe line connections than there are sour gas wells in said field without connections to carbon black plants.

Affiant further states that if said act and order of the Railroad Commission be enforced against The Henderson Company, and even though The Henderson Company be permitted to receive the full 25 per cent of the open flow from the remaining seven wells classified by the Commis- [fol. 231] sion as sour, it will be denied the right to take and receive, under its said casinghead gas contracts, approximately 7,000,000 cubic feet of gas per day, necessary for its requirements to furnish gas to the Combined Carbon Company under its said contract with said company, and for plant operation, and that it will sustain loss and suffer injury in excess of $100.00 per day for the value of the gasoline content contained in such volume of gas which it is so denied from processing in its plant. In addition thereto, its casinghead gas contracts covering the leases and wells located thereon, so classified by the Commission as sweet, will become utterly lost and destroyed and will be subjected to cancellation and forfeiture by the owners of such leases and wells, which casinghead gas contracts, affiant says, are valuable to The Henderson Company to the extent of many thousands of dollars. That in addition thereto, the carbon black contract which The Henderson Company has with said Combined Carbon Company will be subjected to possible cancellation by reason of the failure on the part of The Henderson Company to furnish the

requirements of said carbon company, which carbon black contract, affiant says, is of the value of more than $250,000.00 to The Henderson Company. In addition thereto, if the provisions of said act and order of the Railroad Commission be enforced against The Henderson Company, before long it will be denied the right to use any gas for processing in its said plant and delivering the residue for carbon black manufacture from the remaining wells now calssified as sour, and in such event such company will be compelled to discontinue its operations, close down its plant, and suffer a total loss of hundreds of thousands of dollars.

[fol. 232] N. B. The two contracts referred to in the above testimony were introduced in evidence by the complainant and appear in the record as numbers 2 and 3 of complainant's Documentary Evidence and hence are omitted here.

F. C. Hall further testified as follows:

That for years prior to the time that The Henderson Company and its predecessor in the ownership of its casinghead gasoline plant at Sanford, Texas, F. C. Henderson, Inc., have endeavored to obtain a market for light and fuel purposes for its gas, or any portion thereof remaining at its said plant after the extraction of the gasoline content therefrom, but that The Henderson Company has been unsuccessful, and likewise since said date it has endeavored to obtain a market for its excess residue gas over and above the requirements of the Combined Carbon Company, but that its efforts in this respect have been to no avail. That in the past it has not had, neither has it now, and neither can it hope to obtain in the future, a market for its residue gas for light and fuel purposes, owing to the fact that such market for light and fuel purposes is completely dominated and controlled by the pipe line companies mentioned and referred to in affiant's original affidavit; that in the efforts of The Henderson Company to obtain a light and fuel market for its residue gas it has offered to sell such gas to such pipe line companies, or any one of them who would agree to take the same, upon whatever price basis they might demand, and in addition to this, The Henderson Company has offered to process such residue gas for the purpose of extracting the hydrogen sulphide content

therein, thus making such gas of the absolute kind and character of gas, free from any hydrogen sulphide in its [fol. 233] natural state, and to furnish the same to the pipe line companies at a price commensurate only with the cost of eradicating such sulphur, but such pipe line companies have refused to purchase any gas from The Henderson Company.

Affiant further states that he has made investigation concerning the availability of market outlets for gas produced in the Panhandle field for light and fuel purposes, other than the pipe line companies referred to; that affiant has found that the pipe line companies now operating in the Panhandle area, and those operating in other areas, have lines supplying practically all of the available light and fuel markets within a distance of 1,000 miles of the Panhandle field, and that there are no available markets for gas for light and fuel purposes within said distance of the Panhandle field, which would economically justify the construction of pipe lines and transportation facilities to serve such markets.

Affiant further says that he has read the affidavit of J. C. Fowlston, filed in this cause and dated August 28, 1935, and in reference thereto says that the Northern Natural Gas Company has never, in the past, purchased generally from other operators and lease owners in the Panhandle field and does not now offer to purchase generally from said [fol. 234] other lease owners in the Panhandle field; that the line and gathering facilities of said Northern Natural Gas Company are miles distant from the Sanford area and the properties of The Henderson Company, and are not available to take gas from said properties, even though said company should in the future change its past and present policy and offer a market to others.

Affiant further says that he has read the affidavit of the witness, A. M. Crowell, and that it is not true as intimated therein to the effect that The Henderson Company has been offered an outlet for its gas for light and fuel purposes by a pipe line company; affiant here reiterates that The Henderson Company has never been offered a market for any amount of its gas by any pipe line company operating in the Panhandle field or elsewhere, for light and fuel purposes, or for any other purpose.

[fol. 235] F. C. Hall further testified as follows:

That he is General Manager of The Henderson Company; that the reports to the Railroad Commission made by The Henderson Company since August 1, 1935 show that during the months of October, November, December and January, gas in some excess of the fuel requirements of complainant was taken from the fourteen sweet wells involved in the above cause; that the major portion of this gas was taken during the month of October, and from the period of October 12 to October 29, inclusive, when House Bill 266 was suspended by the District Court of Travis County at the request of the state, and the Commission enjoined from enforcing the provisions thereof; that upon this action taking place the owners of the wells connected with the plant of The Henderson Company demanded that the company resume taking of gas from those wells on the basis of 25 per cent of their open flow, as their contracts provide, the same as the other operators of gasoline extraction plants were then and for sometime had been doing in the Panhandle field; that after the orders of the District Court of Travis County were set aside on October 29, 1935, through an error the superintendent of The Henderson Company's [fol. 236] plant continued to take a small amount of sweet gas from the wells involved in this cause in excess of the company's fuel requirements, which was not discovered by affiant until February 6, 1936, at which time instructions were given to cease taking further sweet gas in any quantity from the wells involved in this cause until a sufficient period of time had elapsed to equalize the volume taken to the volume over such period required by The Henderson Company for fuel requirements. Consequently, the report of The Henderson Company to the Commission, for the month of February discloses that the company only took an average of approximately 3,000,000 cubic feet per day, although its fuel requirements are approximately 8,000,000 cubic feet per day, and that during the present month of March, no gas thus far has been taken from said wells, and no gas will be taken, until shortly after the first of April when the volume heretofore taken since August 1, 1935 will equalize itself to the volume that The Henderson Company would be entitled to take from the wells for its fuel requirements.

[fol. 237] N. B.—The maps referred to in the next succeeding testimony are sent up in the originals by order of the Court.

C. Don Hughes testified as follows:

That he is 39 years of age and resides in Amarillo, Potter County, Texas, and that his business is that of consulting geologist. That he received his technical education at the University of Kansas during the period between 1916 and 1920. From 1920 to 1929, he was employed by the Empire Gas & Fuel Company as geologist and petroleum engineer, his work being in the states of Kansas, Oklahoma and Texas. The first six years of his employment with said company were devoted to the study and solution of oil and gas problems; the last three years of his employment with said company he lived at Amarillo and devoted an increasing amount of time to natural gas problems. Resigning his position with said company in 1929, affiant opened an office as consulting geologist in Amarillo, Texas, where he has lived and practiced his profession since that time. The bulk of his time during the past six years has been devoted to the study of gas problems. During his nine years' work in the Panhandle of Texas, he has become thoroughly familiar with the general geologic structure of the oil and gas producing area in the Panhandle of Texas and with the various formations contained in said structure, from which sweet gas, sour gas and oil have been, and are now being, produced.

Affiant is familiar with the oil and gas producing reservoir in the Texas Panhandle, which comprises the largest known gas field in the world. It extends from southeast Wheeler County across Gray, Carson, Hutchinson, Potter and Moore Counties, and into southeast Hartley County, a [fol. 238] distance of nearly 125 miles, and ranges in width from a few miles to more than thirty miles. This discussion does not include the Cliffside or Helium Area in central Potter County, which is a separate reservoir of helium gas, some ten miles away from the main Panhandle field.

That the area of the Panhandle gas field is underlaid by one large interconnected reservoir; that there is conclusive proof that gas, over a period of time, migrates from one portion of the reservoir to another, with varying pressure

conditions, which are the result of unequal withdrawals of gas from the common reservoir. That there is interconnection between the gas saturated rocks and sand, throughout the entire area, and the rocks and sands which are saturated with both gas and oil. That withdrawal of gas from any portion of said reservoir whether it be in the sweet or sour gas area, will affect the pressure condition of the entire reservoir and thus affect the ultimate amount of recovery of gas from the balance of the reservoir.

That varying pressures exist in the Panhandle gas field, and the manner in which they exist at the present time, as revealed by the set of pressures recently made public by the Railroad Commission of Texas, is shown by a small scale map attached hereto, marked Exhibit "A", showing the outline of the gas area and in various colors the different pressure zones.

That there is sufficient proof to show definitely that there is a continual migration of gas from the areas of high pressure to those of lower pressure. That, as shown on the attached map, the lower pressure areas lie along the north flank of the field, quite coinciding with the most intensely [fol. 239] developed oil productive districts; that the principal factors contributing to those lowest pressure areas were the great withdrawals of gas by hundreds of oil tests drilled in the gas bearing portion of said reservoir, when there was no known method of preventing the escape of such gas into the air as such tests for oil were drilled through the gas bearing formation, and the subsequent withdrawals by many of the same wells in their production of casinghead gasoline, both of which activities obtained their greatest magnitude in 1926, and although in recent years methods and devices are used to prevent the escape of gas from wells drilling through the gas bearing formation, the production of casinghead gas with the production of oil has continued since oil was first discovered in the Panhandle field.

That the portion of the entire Panhandle oil and gas field, which yields gas of importance, totals some 1,140,000 acres, and has been divided by the Railroad Commission, in its order of July 20, 1935, into the East, or Wheeler County field, and the West Panhandle field, the dividing line running north and south at the west side of Lefors townsite, in central Gray County. The approximate acreage division,

as a result of this order, is about 993,000 acres in the West Panhandle field, and 147,000 acres in the East or Wheeler County field. These figures are at variance with those being used by the Railroad Commission, because affiant has confined his study to that portion of the Panhandle gas area which should produce gas in sufficient quantities to be termed "gas acreage". Therefore, he has not included in his outline of such gas field those strictly low areas which do not produce sufficient gas to be saved in wells drilled there but which are abandoned as dry holes. Much of the [fol. 240] area southeast of Lefors falls in this classification; also, much in the Wheeler area east and southeast of Shamrock, but of most importance in the discrepancy between his figures and those of the Railroad Commission, are the low dolomite oil producing areas along the north flank of the field. In those areas, only very small amounts of gas are encountered, as dissolved or occluded with the oil, coming out of the oil in the manner that carbon dioxide gas bubbles out of a newly opened bottle of soda water, and hence have no bearing on the gas problem of the main gas reservoir. This explains why affiant considers the Railroad Commission's figure of 1,504,386 acres excessively high for the area of important or commercial gas which he shows as 1,140,000 acres; likewise, affiant considers the Railroad Commission's figure of 437,724 acres of sour gas too high as contrasted with his figure of 270,000 acres, after eliminating dry areas and strictly oil areas too low structurally for gas.

The portion of the Panhandle field mainly along the north flank contains hydrogen sulphide in the gas and such gas is commonly called sour gas. Basically, the gas containing such sulphur content is the same as sweet gas, or gas which has no hydrogen sulphide content. Sweet gas from such reservoir will produce as much carbon black per thousand cubic feet as will sour gas, and likewise sour gas, eradicated of its hydrogen sulphide content, will furnish as much heat content as gas free from hydrogen sulphide in its natural state. The East Panhandle field, or Wheeler County area, is free from sour gas, leaving the entire sour gas area within the West Panhandle field, which West Panhandle field, is composed of some 270,000 acres of sour gas and 723,000 acres of sweet gas.

In the West Panhandle field, it so happens that the oil [fol. 241] fields around Borger, Sanford and Skellytown, in which there has been intense development for oil, lie in the sour gas area, with the result that the lowering of pressures occasioned by such oil development makes the bulk of the sour gas area have lower pressures than the bulk of the neighboring sweet gas area; the average pressures in the Borger area at most, being around 150 pounds, while to the south some ten miles in the sweet gas area, where development has been negligible in comparison with the Borger area, they attain 400 pounds.

There is no geological barrier in the reservoir formation between the sweet and sour gas areas or between the low and high pressure areas, and consequently, there is a migration of gas taking place from the high pressure areas to the low pressure areas, in an attempt to equalize the pressure over the entire reservoir. Thus, the sweet gas is traveling into the areas formerly occupied by only sour gas, causing a gradual dilution of the sour gas and causing its sulphur content to diminish. In fact, many wells along the border zone between the sweet and sour gas areas have had their hydrogen sulphide content drop from 25 to 30 grains per hundred feet of gas to less than 1 grain, and the border line is gradually moving northward and the sour gas area is constantly diminishing.

According to the records of the Railroad Commission, for the first six months of 1935, the carbon black requirements from the West Panhandle field averaged 472,000,000 cubic feet per day. Of this amount, 62,000,000 cubic feet per day was supplied by oil wells producing with such oil sweet casinghead gas, leaving 410,000,000 cubic feet which [fol. 242] came from the sour gas area of the West Panhandle field. Such records likewise show that during said period the gas pipe line requirements, for light and fuel purposes, which constitute the only market for sweet gas in the Panhandle field other than for carbon black manufacture, were 425,000,000 cubic feet per day, making the total production from the sweet gas area from said West Panhandle field 487,000,000 cubic feet per day. Using the amount of gas consumed for carbon black manufacture and for light and fuel during the first six months of 1935 as the future market demand for such purposes, for gas from the

West Panhandle field, and if no sweet gas be used in the manufacture of carbon black, except casinghead gas produced with oil, and the market of the pipe line companies be confined to the sweet gas, the withdrawal of 410,000,000 cubic feet per day for carbon black purposes will be taken from 270,000 acres of the field, while the pipe line requirements of 425,000,000 cubic feet per day and 62,000,000 cubic feet of casinghead gas produced with sweet oil, will come from 723,000 acres. Thus, the ratio of the market demand in the sour gas area to its acreage is more than twice as great as the ratio of the market demand in the sweet gas area to its acreage. Therefore, on an acreage basis, the withdrawals from the sour gas area will be more than two times the ratio of the withdrawals from the sweet gas area. Contrasting the sweet and sour areas of the West Panhandle field on a total open flow basis, it becomes more striking than on the acreage basis; the market demand of 410,000,000 cubic feet daily must come from the sour gas area, which has a total open flow of 1,619,254,000 cubic feet, or a 25.3 per cent demand of the total open flow of such area, whereas, the market demand from the sweet gas area, which has a total open flow of 7,537,198,000 cubic feet per [fol. 243] day is only 487,000,000 cubic feet per day, or only a 6.4 per cent demand. Such unequal withdrawal would greatly increase the differentials of pressures now existing in said field, causing an increased migration from the sweet to the sour gas area and a greater dilution of the sour gas into the sweet gas, which is now taking place, and there would be a continued and increasing shrinking of the sour gas area, thereby further constricting the area from which gas for the manufacture of carbon black could be taken, and eventually the sour gas area would cease to exist, and with this, the manufacture of carbon black would terminate if the use of gas for such purpose be restricted to the sour gas area. These contrasts are shown graphically on the accompanying charts, marked Exhibits "B" and "C".

Affiant is well acquainted with the Sanford gas area, in which area The Henderson Company owns certain leases and certain contracts with other lease owners, under the terms of which The Henderson Company has the right, and is obligated, to take gas therefrom for processing in its casinghead gasoline plant located at Sanford, Texas, for the purpose of extracting the gasoline content from such

gas and utilizing the residue thereof for the manufacture of carbon black; that the gas in the Panhandle reservoir contains, on an average, approximately .35 of a gallon of gasoline per thousand cubic feet, irrespective of what portion of the reservoir such gas may be withdrawn from. However, in the oil producing areas and where such gas comes in immediate contact with the oil and is produced with the oil, the gasoline content is greater; that in the Sanford area there has been intensive drilling for oil production, and although said area produced initially con- [fol. 244] siderable quantities of oil, the oil productivity of the wells drilled therein has diminished until it is now practically a gas area entirely; that affiant is acquainted with the leases owned by The Henderson Company and those leases under contract with The Henderson Company to furnish gas for the manufacture of casinghead gasoline and carbon black; that the plant of The Henderson Company is connected with twenty-one wells, all of which are gas wells and do not produce any oil. The present pressure condition of the wells with which The Henderson Company is connected range from 185 pounds to 240 pounds. The big majority of these wells, a few years ago, were well within the sour gas area and many of them contained a hydrogen sulphide content as high as 25 grains per hundred cubic feet, but owing to the constant migration of sweet gas from the high pressure zone to the sour area where lower pressures exist, as above pointed out, the hydrogen sulphide content in the gas from the wells connected with The Henderson Company plant have gradually diminished until many of those wells now fall in the classification of sweet gas wells, as defined in House Bill 266, amending Article 6008 of the Revised Civil Statutes of Texas. Although all of such wells connected with The Henderson Company plant still contain hydrogen sulphide, yet, under the classification of sweet and sour gas as contained in said act of the Legislature, the border line dividing the sweet and sour gas areas runs through the very leases connected with The Henderson Company's plant; that by reason of the continual migration of sweet gas into the sour gas area, which has been taking place in the past and which condition will be aggravated and increased in the future, if the use of sweet gas is prohibited in the manufacture of carbon black, [fol. 245] as above pointed out, it is an absolute certainty

that the remaining wells connected with the plant of The Henderson Company, which now fall in the classification as sour wells under the terms of said act, will, within a few years, become sweet wells.

That there are no other gas fields in Texas of any appreciable size containing only sour gas, and neither are there any other gas fields in Texas containing both sweet and sour gas in the same common reservoir, from which any appreciable amount of sour gas could be produced, and if the use of sweet gas for the manufacture of carbon black be prohibited, the result would be that the future carbon black industry in Texas will be restricted to that portion of the sour gas area in the West Panhandle field, which necessarily, under the present operating conditions as detailed above, will exhaust itself long prior to the time that the balance of the gas in said reservoir is exhausted, and doubtless a long time before many of the known gas fields in Texas have been exhausted, where the withdrawals from such fields are denied to carbon black manufacture.

That affiant is acquainted with the markets and market facilities for gas produced in the Panhandle gas field; that the only appreciable markets of any kind or character for such gas are for light and fuel purposes and the processing of such gas for its gasoline content, with the residue thereof going for the manufacture of carbon black; that there is not a general or open market afforded to all the owners of gas in the West Panhandle field; that the only available market for light and fuel purposes in such field is controlled by certain large pipe line companies, who have acquired their own markets, purchased their own reserves drilled their own wells, constructed their own pipe lines and transportation facilities, and are using gas produced from their own [fol. 246] wells to supply their own markets; that such pipe line companies have not, in the past, offered to share generally their markets and transportation facilities with other gas owners and producers in the field, who are without a market, and that such pipe line companies are not now purchasing or offering to purchase generally from the owners of gas in the West Panhandle field; that such pipe line companies own approximately three-fourths of the sweet gas producing area in the West Panhandle gas field; that there are no markets at all for gas produced from the Panhandle field for use in chemical manufacture, excepting carbon black, and affiant knows of no chemicals requiring

the use of any appreciable amount of gas for their manufacture. That there has not been in the past, and neither is there at present any market afforded gas owners in the Panhandle field for the purpose of introducing such gas into the oil or gas bearing horizons in order to maintain or increase the rock pressure or otherwise ultimately increase the production of oil or gas from such horizons, and that only a negligible amount of gas has been heretofore used or is now being used as gas lift in the bona fide production of oil, and that such practices are not in general use in the Panhandle field.

That there are lower pressure areas in the sour gas district of the West Panhandle field than the pressure condition obtaining in the Sanford area, where the leases under contract with The Henderson Company are located; that if no gas be produced from the leases of The Henderson Company, and production from adjoining or nearby leases continues, a lower pressure condition will obtain in the areas of production and the gas underneath the leases of The Henderson Company will, in time, be drained and drawn to the producing areas.

[fol. 247] C. Don Hughes further testified as follows:

At the request of complainant, affiant has made a study of the history of production, the reserves, and the existing pressures as between wells located in what is commonly called the sour gas area in the West Panhandle field and the sweet gas area of such field. Originally the pressure throughout both areas was uniform at about 430 lbs. per square inch. Affiant states that the total area productive of free sour gas is 270,000 acres, containing originally a total volume of approximately 3,155,000,000,000 cubic feet. The area producing free sweet gas in the West field is approximately 723,000 acres, with an original reserve of 12,345,000,000,000 cubic feet. Affiant's estimate of the total production of gas from wells located in the same gas area to date is 2,285,000,000,000 cubic feet. A portion of this gas has been replenished by migration from the sweet gas area, and affiant estimates that there is now contained in the formations underlying the sour gas area approximately 2,297,000,000,000 cubic feet. These figures disclose that there has been a migration from the sweet gas area to the sour gas area of approximately 1,427,000,000,000 cubic feet of sweet gas.

According to the Railroad Commission's records of pressures taken by representatives of that body during the months of June and July, 1935, the average rock pressure of the gas wells located in the sour gas area was 94 lbs. per sq. inch lower than the average rock pressure of the sweet gas wells in the West Panhandle field.

With this wide differential in pressure, there is a tremendous migration of gas from the sweet gas area to the sour gas area. When gas moving from the sweet gas area enters the sour gas area, it is diffused with gas containing [fol. 248] hydrogen sulphide, with the result that the gas produced from wells in the sour gas area is sour, that is, it contains hydrogen sulphide though to a less extent than formerly. One result of the migration of sweet gas into the sour gas area is that the average hydrogen sulphide content of the sour gas now being produced is substantially less than the average content at the time the field was first developed. Another result is that the line dividing the sour gas and sweet gas areas is gradually moving to the northeast and reducing the size of the sour gas area. This is illustrated in the map of Hutchinson County, marked Exhibit A to this supplemental affidavit, which shows in red the former location of the sour gas line and in blue the present location of the sour gas line. In this connection affiant calls attention to the fact that the red line shows the original line separating from the sour gas area the area producing sweet gas containing substantially no hydrogen sulphide, based on less accurate tests than those employed now. It is concluded that had present methods of testing been used, the red line showing the demarcation between sour and sweet areas at the time of discovery of the field would have been more than a mile southwest of where it is shown. The blue line marks the present location of the sour gas line, using the statutory definition of sour gas as the basis of separation, which classifies as sweet any gas containing less than 1½ grains per 100 cubic feet. However, many of the wells between the red and the blue lines once contained substantially more than 1½ grains per 100 cubic feet and now show no substantial content of hydrogen sulphide. Most of the oil producing areas in the West Panhandle field are located in the so-called sour gas area. Naturally, large quantities of gas are being produced in connection with the [fol. 249] production of oil. This production of gas from

oil wells has contributed very materially to the differential in pressure between the sweet and the sour gas areas, and has been materially responsible for the tremendous migration of gas from the sweet gas area to the sour gas area. The continued oil field operations will, of course, tend to cause a continuance of this pressure differential, regardless of regulation in the production of gas from wells not producing oil.

Since October 1, 1935, the sour gas wells have been permitted to produce approximately 25% of their potentials. Under the order effective February 1, 1936, sour gas wells are limited to 15% of their potentials. The orders affecting sweet gas wells in the West Panhandle field, including that effective February 1, 1936, have limited the production from sweet gas wells to approximately 7% of their potentials. Taking the whole sweet gas area, the allowable has been approximately 6% of the potentials. Thus it appears that under the previous orders sour gas wells were permitted to produce at a rate, based on potentials, of approximately four times that of sweet gas wells, and under the present order they will be permitted to produce at more than twice the rate, based on potentials, of sweet gas wells. All these orders have manifestly increased the pressure differentials now existing, with a consequent increase in the migration of gas from the sweet gas area to the sour gas area. The inevitable result will be that enormous quantities of sweet gas will be drained from beneath the sweet gas area into the sour gas area and there produced from wells classified as sour gas wells. Under the statutory provision permitting the use of sour gas only for the manufacture of carbon black, it will inevitably follow that much of the gas which could now be produced from wells classified as sweet [fol. 250] gas wells will be produced from wells now classified as sour gas wells and will be subject to use for the manufacture of carbon black. The only difference in producing this gas from sour gas wells and thus using it, and in producing it from sweet gas wells and burning it to carbon black, is that under the operation of the statute this migrating gas will be produced by others than its present owners, while its present owners will be denied that use and will thus lose their gas to their neighbors across the sour gas line. This is not a theoretical loss, nor is it an

inconsequential loss. It is clearly demonstrable from the physical facts, and will run into substantial values in a very short time.

Even if every well classified as a sweet gas well were producing its allowable and delivering gas to the outlets for those uses allowed for sweet gas under the statute, the observations in the next preceding paragraph would apply. As a matter of fact, however, many of the wells classified as sweet gas wells have no present outlet for uses permitted under the statute, and these wells may be shut down for an indefinite time for lack of a market outlet for permitted uses. These wells for the most part are located in close proximity to the sour gas line, and these wells would be subjected to special and immediate drainage as a result of producing the full permitted outlet for carbon black purposes to be produced from the wells now classified as sour gas wells. The sum total of the practical operation of this statute as applied to these sweet gas wells located for the most part to the south and west of the sour gas line will be that the owners of these wells will not be permitted to produce this gas and use it for carbon black, and for the time being will not have a market outlet for light and fuel uses, and they will contribute enormous quantities of gas from the leases [fol. 251] on which their present wells are located to those who produce gas for the manufacture of carbon black, with no material difference from the standpoint of the State in that this gas now sweet will be produced as sour gas after being diffused with gas now sour.

Applying the observations above made to the conditions prevailing in southwest Hutchinson County, where are located the plant of the Henderson Company and the wells connected thereto, affiant shows that there are 21 wells connected to this Henderson plant, all of which are marked by the letter "H". Seven of these wells are north and east of the sour gas line and fourteen of these wells are to the south and west thereof. Several of the fourteen wells now classified as sweet were formerly sour gas wells. Those most remotely situated with reference to the sour gas line have been produced only about one year. A large number of the wells located in the same area and classified as sour gas wells are connected to other plants than the Henderson plant, and a result of producing all the sour gas wells in this area up to 15% of their potentials will inevitably be

that enormous quantities of gas will be drained from the fourteen wells connected to the Henderson plant, but not now being produced because of their classification as sweet gas wells, to the wells in the same area classified as sour gas wells.

The open flow of the sour gas wells, according to the findings of the Commission, is only 2,524,617,000 cubic feet. That of sweet gas wells in the West Panhandle field is 8,506,630,000 cubic feet; and that of the entire sweet gas area in the Panhandle reservoir is 15,519,570,000 cubic feet. It thus appears that the sour gas open flow is only approximately 23% of the total open flow of wells in the West Panhandle field, and approximately 14% of the total open flow [fol. 252] for the reservoir. In acres, the sour gas area embraces 27% of the total West Panhandle field, and 23% of the total reservoir. The allowable under the present order to the sour gas wells is 378,693,000 cubic feet, while that to the sweet gas wells in the West Panhandle field is 625,803,000 cubic feet, and that of the combined sweet gas area in the entire field is 824,848,000 cubic feet. It thus appears that under the present order the sour gas wells are permitted to produce 37% of the total allowable in the West Panhandle field, and more than 31% of the allowable for the entire field. The discrepancy under the orders prior to the February order was even greater. To allow 37% of the production from the West Panhandle field to be produced from wells having only 23% of the open flow in the West field, or 14% of the total open flow from the entire reservoir, and from acreage embracing only 27% of the West Panhandle field, or 23% of the total area, obviously tends to continue the condition above pointed out, which had resulted and is resulting in the migration of very large quantities of gas from the sweet gas area to the sour gas area.

Under the conditions reflected by the facts above related, there is no danger that sour gas will migrate into the sweet gas area. The areas productive of sweet gas, as already pointed out, have a pressure of about 94 lbs. higher than the wells in the sour gas area. The continuance of the oil field operations will tend to keep the pressures down in the sour gas area, and the production of gas for carbon black purposes on both sides of sour gas line will tend to prevent such migration. However, even if the gas be produced from [fol. 253] the sweet gas wells not now connected to light

and fuel markets and from the sour gas wells in the same proportion, there would still be migration of gas from the sweet gas area into the sour gas area on account of the pressure differential already in existence, which the operations in the oil fields will tend to maintain indefinitely.

Affiant has prepared the map above referred to, marked Exhibit A and made a part of this affidavit, and the facts reflected thereby and shown in detail by reference to the legends attached thereto, in affiant's opinion, correctly represent the actual physical facts.

By way of explanation of the terms "sour gas" and "sweet gas" affiant states that he has made a study of the facts concerning the presence of sour gas in the West Panhandle field and its causes. It is affiant's opinion that the presence of this sour gas in the same formations with sweet gas, particularly in view of the fact that there is no physical barrier in the formation between the sour gas and sweet gas, can be explained only on the theory that at some time in the past hydrogen sulphide has been introduced into the gas-bearing formations at some point to the north and east of the sour gas line as it was located at the time the field was first developed. The source of this hydrogen sulphide is not known; but cores and cuttings from wells drilled in the sour gas area, so far as known to affiant, indicate no actual presence of formational sulphur or sulphur compounds in such quantities as that sweet gas coming into the sour gas area would be polluted by contact with it. Prior to the development, the gas in the reservoir was in [fol. 254] a static condition—that is to say, there was no migration over considerable distances of a particular mass of gas. While this hydrogen sulphide coming in from the north and east, under the laws governing diffusion of gases, would ultimately have permeated the entire reservoir, its spread was necessarily extremely slow while the gas remained in this static condition, and it had progressed only to the boundaries marked by the so-called sour gas line at the time the development of the field commenced. Over future geological ages, had the reservoir not been disturbed through the drilling of wells, this sour gas line would have gradually moved to the south and west until ultimately it would have been diffused throughout the entire volume of gas contained within the reservoir, and the whole reservoir would have been composed of sour gas, though the per

unit contamination would have been materially less than the sulphur content of the gas found in the so-called sour gas area at the time the field was developed a few years ago.

[fol. 255] J. D. THOMPSON, JR., testified as follows:

That he is 45 years of age, residing in Amarillo, Potter County Texas; that his business is that of consulting geologist; that he received his technical education at Denison University, Granville, Ohio, and Cornell University, Ithaca New York, and that he graduated from Denison University, majoring in geology in 1914; taking a degree of Bachelor of Science and thereafter did graduate work for approximately 2 years in geology in Cornell University, serving as instructor in geology in that department of Cornell University; that in the year of 1916 affiant took the position of oil geologist for the Empire Gas & Fuel Company, and has been engaged in that work since that time; that in the spring of 1922 he accepted a position with the Gulf Production Company as district geologist in the Texas Panhandle oil and gas fields, which position he held for seven years, and during which time he was either resident geologist for the Gulf Production Company in Amarillo or had charge of the geological work of said company in the Texas Panhandle field; that he resigned his position with the Gulf Production Company in August, 1929, and opened an office in Amarillo, Texas, as consulting geologist, and has since specialized in oil and gas geology of the Texas Panhandle field.

That the Panhandle gas field is the largest known producing gas field in the world, and according to the official figures of the Railroad Commission of Texas such field covers an area of 1,504,386 acres. Of this, 1,066,662 acres is sweet gas land and 437,724 acres is sour gas land. It extends from the south and eastern part of Wheeler [fol. 256] County, Texas in a northwesterly direction across said county and through and across the counties of Gray, Carson, Hutchinson, Potter and Moore, and into the southern part of Hartley, the length of said field being approximately 125 miles, with a width of approximately eight to thirty miles. Although the figures of the Railroad Com-

mission as to the total area and the sweet and sour gas portions thereof are somewhat higher than affiant would fix for that portion of the Panhandle field which would yield gas of importance, yet the same will be used as a basis of comparison in this discussion. Using the total acreage figures of the Railroad Commission as a basis, it is estimated that the West Panhandle field, as defined by the Commission in its order of July 20, 1935, contains approximately 1,203,299 acres; that the entire sour gas area of said field lies within the West Panhandle area, which therefore leaves 765,575 acres as sweet gas land in the West Panhandle field. Upon this basis, therefore, the West Panhandle field contains approximately twice as much sweet gas land as it does sour gas land.

Originally, the gas pressure of the Texas Panhandle gas field was approximately 430 pounds per square inch. This pressure was uniform, regardless of the depth or geographical position of any well in the field. The uniformity of original pressure, the production of gas from the same horizon over the entire field, the increasing pressure in lower pressure areas when production in such areas ceases, and knowledge of the pay formation, prove beyond doubt that this field is underlaid by a common reservoir of both oil and gas and that withdrawals of gas from any specific locality in the West Panhandle field will tend to reduce the pressure of the entire area and affect the ultimate amount of recovery from the balance of said reservoir.

[fol. 257] That the sour gas area generally lies along the northern edge of the West Panhandle field gas reservoir. That in this sour area is located the Borger, Sanford, and various other oil pools; that generally in the sour gas area the rock pressure is lower than the pressure in the sweet gas area, and particularly is this true in that portion in the sour gas area in the western part of Gray County and the Eastern part of Carson and Hutchinson counties, in which area the rock pressure in the sour gas area varies approximately from 180 to 245 pounds per square inch, and the pressure in the sweet gas area varies approximately from 245 to 380 pounds per square inch. This pressure differential obtaining in the Panhandle gas field has been due principally to the loss of gas occasioned in the drilling and completing of the oil wells in the various pools located in the sour gas area, and also, to the subsequent production

of casinghead gasoline from gas produced with oil, which operation in said area has been taking place, and particularly in Hutchinson County, for approximately nine years.

That there is no structural barrier between the sweet and sour gas areas in said Panhandle field; that on account of the rock pressure obtaining in the sour gas area, gas from the sweet gas area where a higher rock pressure obtains, is constantly migrating into the lower pressure areas, and thus the sweet gas is permeating the sour gas area and the sour gas is being constantly diluted and its sulphur content decreased; that by reason of this fact, the dividing line between the sweet and sour gas areas in the West Panhandle field, generally, is constantly moving farther back into the sour gas area and the sour gas area, therefore, is becoming diminished, and wells in such field that were once [fol. 258] sour wells are now sweet wells.

That in the event the entire gas field should be closed *in* no production therefrom had for any purpose, the pressures in said gas reservoir in time would equalize and the sweet gas therefore, would migrate into the sour gas, diluting such sour gas and decreasing its hydrogen sulphide content to such extent that when the equalization of the pressure in said reservoir occurred, a large portion of the present sour gas area would contain less than 1½ grains of hydrogen sulphide per hundred cubic feet of gas contained therein. But, under continued production for the purposes authorized in House Bill 266, the differentials of pressure in said reservoir and the resulting migration of sweet gas into the sour gas area will be accentuated. According to the records of the Railroad Commission for the first six months of 1935, the carbon black requirements from the West Panhandle field averaged 472,000,000 cubic feet per day. Of this amount 62,000,000 cubic feet per day was supplied by oil wells producing with such oil sweet casinghead gas, leaving 410,000,000 cubic feet which came from the sour gas area of the West Panhandle field. Such records likewise show that during said period the gas pipe line requirements for light and fuel purposes, which constitute the only market for sweet gas in the Panhandle field, other than for carbon black manufacture, were 425,000,000 cubic feet per day, making the total production from the sweet gas area from said West Panhandle field during said period 487,000,000 cubic feet per day. The potential open

flow capacity of all sour gas wells in the West Panhandle field is 1,619,254,000 cubic feet per day, and the open flow capacity of all sweet wells in the West Panhandle field is [fol. 259] 7,537,198,000 cubic feet per day. Using the amount of gas consumed for carbon black manufacture and for light and fuel from the West Panhandle field during the first six months of 1935 as the future market demand for such purposes from said field, and if no sweet gas be used in the manufacture of carbon black except casinghead gas produced with oil, and the market of the pipe line companies be confined to the sweet gas, the withdrawal of 410,000,000 cubic feet per day for carbon black purposes will be taken from an area with an open flow, or capacity to produce, of only 1,619,254,000 cubic feet per day, or 18 per cent of the total open flow of all wells in the West Panhandle field, while the pipe line requirements of 425,000,000 cubic feet and 62,000,000 cubic feet of casinghead gas produced with sweet oil, will come from an area the open flow of which is 7,537,198,000 cubic feet per day, which constitutes 82 per cent of the total open flow, or capacity to produce, of all wells in the West Panhandle field. Thus, the demand from the sour gas area will be 25.3 per cent of the total open flow of all wells in such area, whereas the demand from the sweet gas area will be only 6.4 per cent of the total open flow of all wells in such area. Such unequal withdrawal would greatly increase the differentials of pressure now existing in said field and thereby cause an increased migration from the sweet to the sour gas area and a greater dilution of the sour gas into the sweet gas, which is now taking place, and there would be a continued and increased shrinkage of the sour gas area, thereby further constricting the area from which gas for the manufacture of carbon black could be taken, and eventually the sour gas area would virtually cease to exist as such.

[fol. 260] That in the Sanford area, where the leases connected with the plant of The Henderson Company are located, there has been intensive drilling for oil production, and although said area has produced in the past considerable quantities of oil, the oil productivity of the wells drilled therein has diminished until it is now practically a gas area entirely; that affiant is acquainted with the leases owned by The Henderson Company and those leases under contract with the Henderson Company to furnish

gas for the manufacture of casinghead gasoline and carbon black, and that the wells connected with the plant of The Henderson Company do not produce any oil; that the present pressure conditions of said wells range from 185 pounds to 240 pounds; that the big majority of said wells, a few years ago, were well within the sour gas area, and many of them contained a hydrogen sulphide content as high as 25 grains per hundred cubic feet, but, owing to the constant migration of sweet gas from the high pressure zone to the sour gas area, where lower pressures exist, the hydrogen sulphide content in the gas from the wells connected with The Henderson Company's plant has gradually diminished until many of those wells now fall in the classification of sweet wells, as defined in House Bill 266; that by reason of the continual migration of sweet gas into the sour gas area, which condition has been taking place in the past, and which condition will be aggravated in the future, if the use of sweet gas is prohibited for the manufacture of carbon [fol. 261] black, it is an absolute certainty that the remaining wells connected with the plant of The Henderson Company, which now fall within the classification of sour wells, under the terms of said act, within a few years will become sweet wells.

That affiant is acquainted with the markets and market facilities for gas produced in the Panhandle gas field; that the only appreciable markets of any kind or character for such gas are for light and fuel purposes and the processing of such gas for its gasoline content, with the residue thereof going for the manufacture of carbon black; that there is not a general open market afforded to all the owners of gas in the West Panhandle field; that the only available market for light and fuel purposes in such field is controlled by certain large pipe line companies, who have acquired their own markets, purchased their own reserves, drilled their own wells, constructed their own pipe lines and transportation facilities, and are using gas produced from their own wells to supply their own markets; that such pipe line companies have not, in the past, offered to share generally their markets and transportation facilities with other gas owners and producers in the field, who are without a market, and that such pipe line companies are not now purchasing or offering to purchase generally from the owners of gas in the West Panhandle field; that such

pipe line companies own approximately three-fourths of the sweet gas producing area in the West Panhandle gas field; that there are no markets at all for gas produced from the Panhandle field for use in chemical manufacture, [fol. 262] excepting carbon black, and affiant knows of no chemicals requiring the use of any appreciable amount of gas for their manufacture. That there has not been in the past, and neither is there at present any market afforded gas owners in the Panhandle field for the purpose of introducing such gas into the oil or gas bearing horizons in order to maintain or increase the rock pressure or otherwise ultimately increase the production of oil or gas from such horizons, and that only a negligible amount of gas has been heretofore used or is now being used as gas lift in the bona fide production of oil, and that such practices are not in general use in the Panhandle field.

That there are lower pressure areas in the sour gas district of the West Panhandle field than the pressure condition obtaining in the Sanford area, where the leases under contract with The Henderson Company are located; that if no gas be produced from the leases of The Henderson Company, and production from adjoining or nearby leases continues, a lower pressure condition will obtain in the areas of production and the gas underneath the leases of The Henderson Company, in time will be drained and drawn to the producing areas.

"There is no early data available on the hydrogen sulphide content of the gas produced from the wells in the field. The exact location during the history of the field of the sweet-sour gas line cannot be determined because of the absence of such early data. We do know the location of this sweet-sour gas line as of July, 1935, from data and information obtained at and immediately prior to that time by the Railroad Commission. The well known and referred to as the Vaniman #2, located in the Northeast quarter [fol. 263] in section 175, of Block 3, I&GN survey is situated south of the sweet-sour gas line as located by the Railroad Commission. This well at one time was classified as sweet by the Railroad Commission, and when tested on open flow at capacity was found to contain more than 1½ grains of hydrogen sulphide per 100 cubic feet, and reclassified by the Railroad Commission as sour."

The commingling of sweet and sour gas contained in a common or single reservoir could not, in itself, cause any underground waste or loss of gas; that the only possible thing that could cause any underground waste in this gas reservoir would be unequal rate of withdrawals in different portions of such reservoir, which would accentuate the migration of the gas from the high pressure areas to the low pressure areas, over great distances, and might in local and unimportant instances result in the coning of water in the gas pay formation, and trapping of gas away from the well bores.

Assuming that increased commingling of sweet and sour gas in a common pool will result from increased migration of sweet gas into the sour gas area, or vice versa, and that commingling of sweet and sour gas in a common pool constitutes underground waste, which affiant denies, and bearing in mind that water coning in the gas pay formation and trapping of gas, above mentioned, is caused by unequal withdrawals, then the provisions of House Bill 266, if enforced, instead of preventing underground waste in the Panhandle field, would cause underground waste in the Panhandle field, for this reason: that the withdrawals to the extent of the market demand for carbon black manu- [fol. 264] facture must come from the sour gas area, which withdrawals will amount, under the present market demand, to approximately 25.3 of the total daily open flow, or capacity to produce, of said area, whereas the withdrawals for the uses of sweet gas as provided in said act, under the present market demand, would amount to approximately 6.4 per cent of the total daily open flow, or capacity to produce, of the sweet gas area. This great disproportion in the rate of withdrawals would greatly accentuate the migration of gas from the sweet area into the sour area, as fully set out in my original affidavit.

Affiant further says that the production of sweet gas in the Panhandle field for use in the manufacture of carbon black will no more result in underground waste, or affect the total ultimate recovery of gas, than the exclusive use of sour gas for that purpose from said field.

[fol. 265] J. B. Massa testified as follows:

That he is 34 years of age and resides at Pampa, Gray County, Texas, and is engaged in the business of consulting gas engineer; that affiant received his technical training at St. Mary's College, St. Mary's, Kansas; that for two years he was connected with the Engineering Department of the Tidewe Oil Company at Tampico, Mexico. Since 1923, he has been engaged in the general gas engineering business, including the construction and designing of casinghead gasoline plants and compressor facilities, and the operation thereof, which work involved the measurement and testing of natural gas and the transportation and compression of the same, and during which time he has been connected with the natural gasoline department of the Wooten-Hughes Corporation, Phillips Petroleum Company and White Eagle Oil & Refining Company, and from October, 1931 to November, 1933, was employed by the Railroad Commission of Texas as Natural Gas Engineer, stationed at Pampa, Gray County, Texas. He resigned his position with the Railroad Commission of Texas, on November 1, 1933, to open an office at Pampa, Texas, as consulting gas engineer, in which business he has been engaged since said time. That during the time affiant was employed by the Railroad Commission of Texas as Natural Gas Engineer, and for three years prior thereto, as well as since that time, it became affiant's duty to give a great portion of his time to the study of all phases of the [fol. 266] Texas Panhandle gas field, including the formation, the character of gas capable of being produced therefrom, the pressure conditions over the reservoir, the amount of production therefrom and the disposition of the same and the amount and market facilities for such gas, whether sweet or sour.

Originally, the gas pressure in the Panhandle field was approximately 430 pounds per square inch. This pressure was uniform, regardless of the depth or geographical location of any well in such field. The uniformity of such gas pressure, together with knowledge of the pay formations, indicates that this field must be regarded as a common reservoir for both oil and gas and that withdrawals of gas from any specific locality in the West Panhandle field must tend to reduce the pressure over the entire area. Due to withdrawals of gas from the field, a sharp differential in pres-

sure has been established between the areas where withdrawals have been comparatively small and areas where withdrawals have been large. In the least drained portions of Carson, Potter and Moore Counties, pressures in excess of 400 pounds prevail, while in the area of the greatest drainage, in the Borger district of Hutchinson County, pressures have declined to as low as 155 pounds. It is obvious that with this pressure differential obtaining in said field a migration of gas from a high to a low pressure area is to be expected and does, in fact, exist.

The West Panhandle field, as designated by the Railroad Commission in its order of July 20, 1935, contains all of the area in the Panhandle field known as the sour gas producing area, such gas being gas that contains hydrogen sulphide. Due to the fact that the sour gas is associated [fol. 267] with oil produced from the lime and dolomitic lime formations, which were extensively drilled during the early history of the field, the sour gas was depleted much more rapidly than the sweet gas, which was not associated with oil production, and therefore, was not extensively drilled until a later date. It is to be borne in mind that much of the early depletion of the sour gas occurred incidentally to the production of oil, as pure wastage, in that hundreds of wells having been drilled for oil were drilled at a time when there was no known method to prevent the escape of gas into the air while such wells were being drilled through the gas bearing formation into the oil horizon below, and, such wells after completion, in the production of oil necessary have produced a large quantity of gas. Hence, the natural gasoline industry in the Panhandle field was developed to salvage the gasoline content of the gas which was being wasted in connection with the production of oil. It so happens that the major oil producing pools in the West Panhandle field, in which there has been intense development for oil lie almost wholly within the sour gas area. This accounts for the lower rock pressure obtaining in the sour gas area than in the sweet gas area of the West Panhandle field. Therefore, there has been established constant migration of sweet gas into the sour gas area and a resultant dilution of the hydrogen sulphide content of the sour gas. There is no structural barrier between the sweet and sour areas of the West Panhandle field and the migration of sweet gas into the sour gas area will

continue until an equilibrium in rock pressure is reached [fol. 268] between the two areas, even though production from all gas wells in both areas were completely shut down and that eventually such migration will greatly diminish and practically eliminate the sour gas area in Hutchinson County. However, if the uses of gas from the West Panhandle field be restricted for the purposes authorized under House Bill 266 amending Article 6008, this migration of sweet gas into the sour gas area will be greatly accentuated by necessary unequal withdrawals from the sweet and sour gas areas in said field in order to fulfill the market requirements for the gas produced from such areas, for the reason that, according to the Official Records of the Railroad Commission of Texas, for the first six months of 1935, the requirements from the sour gas area in the West Panhandle field averaged 410,000,000 cubic feet per day, whereas the requirements from the sweet gas area of the West Panhandle field were 487,000,000 cubic feet per day, while such records of the Railroad Commission also reflect that the total open flow of all gas wells located in the sour gas area is 1,619,254,000, or 18 per cent of the total open flow of the West Panhandle field, and the total open flow of all wells located in the sweet gas area of the West Panhandle field is 7,537,198,000 cubic feet, or 82 per cent of the total open flow of all wells in said field. Thus, if the gas capable of being produced from the West Panhandle field be restricted to the uses authorized in House Bill 266, 18 per cent of the total open flow of the West Panhandle field will be called upon to produce 46 per cent of the total market for all gas from said field, and 82 per cent of the total open flow of all [fol. 269] gas in said field will be called upon to produce 54 per cent of the total market therefrom. Thus, the demand from the sour gas area will be 25.3 per cent of the total open flow of all wells in such area, whereas the demand from the sweet gas area will be only 6.4 per cent of the total open flow of all wells in such area. Such unequal withdrawals therefore will necessarily greatly increase the differentials of pressure now existing in said field and thereby cause an increased migration from the sweet to the sour gas area and a greater dilution of the sour gas into the sweet gas and eventually, the sour gas area will cease to exist.

That in the Sanford area, where the leases connected with the plant of The Henderson Company are located, there has been intensive drilling for oil production, and although said area has produced in the past considerable quantities of oil, the oil productivity of the wells drilled therein has diminished until it is now practically a gas area entirely; that affiant is acquainted with the leases owned by The Henderson Company to furnish gas for the manufacture of casinghead gasoline and carbon black, and that the wells connected with the plant of the Henderson Company do not produce any oil; that the present pressure conditions of said wells range from 185 pounds to 240 pounds; that the big majority of said wells, a few years ago, were well within the sour gas area, and many of them contained a hydrogen sulphide content as high as 25 grains per hundred cubic feet, but, owing to the constant migration of sweet gas from the high pressure zone to the sour gas area, where lower pressures exist, the hydrogen sulphide content in the gas from the wells connected with The Henderson Company's [fol. 270] plant, has gradually diminished until many of those wells now fall in the classification of sweet wells as defined by House Bill 266; that by reason of the continual migration of sweet gas into the sour gas area, which condition has been taking place in the past and which condition will be aggravated in the future if the use of sweet gas is prohibited for carbon black manufacture, it is an absolute certainty that the remaining wells connected with the plant of The Henderson Company, which now fall within the classification of sour wells, under the terms of said act, within a few years will become sweet wells.

That there are lower pressure areas in the sour gas district in the West Panhandle field than the pressure conditions obtaining in the Sanford area where the leases under contract with The Henderson Company are located. That if no gas be produced from the leases of The Henderson Company and production from adjoining or nearby leases continues, a lower pressure condition will obtain in the areas of production and the gas underneath the leases of The Henderson Company will, in time, be drained and drawn to the producing area.

That there is no use for gas produced and capable of being produced in the Panhandle field except for light and fuel purposes and casinghead gasoline manufacture, with

the residue thereof going to carbon black plants for the manufacture of carbon black; that there is not a general or open market afforded to all the owners of gas in the West Panhandle field; that the only available market for light and fuel purposes in such field is controlled by certain large pipe line companies, who have acquired their own markets, purchased their own reserves, drilled their own wells, con- [fol. 271] structed their own pipe lines and transportation facilities, and are using gas produced from their own wells to supply their own markets; that such pipe line companies, in the past, have not offered to share generally their markets and transportation facilities with other gas owners and producers in the field, who are without a market, and that such pipe line companies are not now purchasing or offering to purchase generally from the owners of gas in the West Panhandle field; that there are no markets at all for gas produced from the Panhandle field for use in chemical manufacture, excepting carbon back, and affiant knows of no chemicals requiring the use of any appreciable amount of gas for their manufacture; that there has not been in the past, and neither is there at present, any market afforded gas owners in the Panhandle field for the purpose of introducing such gas into the oil or gas bearing horizons in order to maintain or increase the rock pressure or otherwise ultimately increase the production of oil or gas from such horizons; that there is no market in the Panhandle field for gas to be used as gas lift in the bona fide production of oil, and that there is only a negligible amount of gas required for such purposes and that such practices are not in general use in the Panhandle field.

That the gas capable of being produced in the Panhandle field cannot, within the bounds of economic practice, be reintroduced into the formation from which the same was originally produced. Calculations based upon ten year amortization of the investment necessary to construct and operate machinery and facilities for the return of residue gas to its original formation, indicate that some plants in the [fol. 272] Panhandle field could conduct such an operation without loss, when the selling price of natural gasoline is 3.4 cents per gallon, while others could not conduct such an operation without loss, unless the selling price of gasoline is above 3.9 cents per gallon. The average selling price for Panhandle natural gasoline for the year 1934 was 2.49

cents per gallon, while the average price for the years 1932, 1933 and 1934, was 2.83 cents per gallon. Based upon these prices, the loss incurred by the plant operator in returning the residue to the horizon from which such gas was produced would range from approximately ½ cent to 1 cent per gallon of gasoline manufactured. Aside from this, there are other reasons why the return of residue gas into the horizon from which the same is produced for gasoline manufacture would be an impractical and impossible operation, regardless of the cost of such operation, and that is this: It would be impossible to introduce such gas back into the gas bearing formation through the identical wells producing such gas, as gas cannot be stored nor confined after being produced, and the residue of such gas, after the extraction of the gasoline content therefrom must be disposed of as such gas is processed; that the only possible way such gas could be introduced back into the formation underlying the lease from which the same is produced would be to drill sufficient wells thereon to the gas formation through which the volume of gas produced from such wells could be introduced back into the gas bearing formation underlying such lease. The injection of lean or denuded gas into the withdrawal area of the plant processing such gas for its gasoline content will immediately set up a dilution of the raw gas supply of the plant, thereby reducing the amount of recoverable gasoline therefrom, and it would be only a matter of a few months until the gasoline content of this mixture, of recycled and raw gas, would be so low as to bring about unprofitable operation. In order to prevent such an effect upon the gas reserves of the gasoline plant conducting such an operation, it would be necessary to transport the gas through a pipe line over a long distance to a point well beyond the gathering area of the plant in question. Such operation would have the effect of diminishing the gasoline content at the point of introduction and thereby change the character and nature of the gas in place under the land belonging to others and thereby in all probability subject such operator to various and sundry claims and actions for damages by lease and royalty owners in the vicinity of the point of injection of said gas.

[fol. 2731]

I am acquainted with the plant of the Portland Gasoline Company, which is located on the southwest quarter of sec-

tion 163, block 3, I&GN Survey, Gray County, Texas. The gas which it processes is produced within a radius of three miles of that point. This company has connected to its plant three sour gas wells which are Rondebaw Oil and Gas Company, Vaniman No. 1 and No. 2, and McKinney No. 2.

The Vaniman No. 1 well is located approximately on the sour gas line, and the Vaniman No. 2 well is located just south of the sour gas line, having been formerly classified as sweet, but being found upon retest under open flow conditions to contain slightly more than 1% grains of hydrogen sulphide per 100 cubic feet.

[fol. 274] Roy Penrose testified as follows:

That he is 47 years of age; that he resides at Pampa, Gray County, Texas, and that he is engaged in the business of gas engineering; that he has been engaged in such business for the past twenty five years, and that he has been engaged in such business in the Panhandle field of Texas for the past nine years; that such business in which affiant is engaged embraces the construction of gasoline extraction plants and booster plants, testing of gas as to its volume, rock pressure, gasoline content, hydrogen sulphide, and other constituents and byproducts.

That in the conduct of the business of affiant, he has made an extensive study and has accumulated data and ascertained facts concerning all phases of the Panhandle gas field, including the gas producing formation in said field, the character and state of development for gas that has been made in such field, the nature and character of such gas, the purposes for which the same can be used, the cost of the construction of plants, equipment and facilities for the extraction of the gasoline content obtained from said gas, and the eradication of hydrogen sulphide contained in such gas, and the cost of the construction and operation of facilities sufficient to re-pressure gas for the purpose of introducing the same into the horizon from which it is produced.

That there is no use for gas produced, and capable of [fol. 275] being produced in the Panhandle field, except for light and fuel purposes and casinghead gasoline manufacture, with the residue going to carbon black manufacture;

that there is no use for such gas for the purpose of chemical manufacture nor for the introduction thereof into an oil or gas bearing horizon in order to maintain or increase the rock pressure or otherwise increase the ultimate recovery of oil or gas from such horizon; that such utilization has never been, and is not now being practiced in the Panhandle field; that there is no appreciable use for such gas for the purpose of gas lift in the production of oil in the Panhandle field; and gas that is being used for such purpose is negligible, and there is no market at all offered to gas owners for their gas, to be used for such purposes; that the gas capable of being produced in the Panhandle field cannot be, within the bounds of commercial practice, introduced into the horizon from which it is produced, and that no appreciable amount of such gas can be introduced into the gas bearing horizon in the Panhandle field at an operating cost of less than one cent, after a processing plant and facilities have been installed for such purpose. That the cost of the construction of a booster plant and equipment, including gas pipe line facilities and connections sufficient to introduce fifty million cubic feet of gas per day into the horizon from which such gas is produced would be in excess of $250,000.00; that the cost of reintroducing gas into the horizon from which it is produced would cost many times more than the revenue obtained from the extraction of the gasoline [illegible] content from such gas.

That it would be impossible to introduce such gas back into the gas bearing formation through the identical wells producing such gas, as gas cannot be stored nor confined after produced, and the residue of such gas after the extraction of the gasoline content must be disposed of as often as processed; that the only possible way such gas could be introduced back into the formation underlying the same from which the same is produced, would be to drill sufficient wells thereon to the gas formation through which the volume of gas produced from such lease could be reintroduced back into the gas bearing formation underlying such lease; and, regardless of how small the cost and expense of this operation might be, it would be impractical and not economically justified for the operator of a casinghead gasoline plant to do so, for the reason that such gas so reintroduced back into the gas bearing formation, having been stripped of its gasoline content will be upon production

through the producing wells on such lease and the gasoline content in such gas speedily will diminish, and in a short time such operation will amount to nothing more than cycling of dry gas without any gasoline content therein; that to transport such residue gas a distance away from the gasoline extraction plant and to introduce the same into the gas bearing formation underlying the land or leases of others, in order to prevent a recycling of such gas in such casinghead gasoline plant, such operation would have the [fol. 277] effect of diminishing the gasoline content at the point of introduction and thereby change the character and nature of the gas in place under the land belonging to others.

Affiant further says that there is no basic difference between the sweet and sour gas contained in the Panhandle gas field as to its B.T.U. content or carbon black productivity; that sour gas cannot be used in its natural state for domestic fuel consumption, but after the hydrogen sulphide content has been eradicated it is as fit for this purpose as gas free from any trace of such sulphur in its original state; that there is no appreciable difference in eradicating the hydrogen sulphide content from gas containing a small quantity of such sulphide and the cost of eradicating the hydrogen sulphide content from gas containing a large quantity of such sulphide. That affiant has made a study of the character and nature of equipment and facilities necessary for scrubbing sour gas for the purpose of eradicating the hydrogen sulphide content therein, and that fifty million cubic feet of gas per day could be scrubbed for the purpose of removing the hydrogen sulphide content therein, at a cost of approximately one fourth cent per thousand cubic feet, including the amortization of the construction cost of the plant and equipment used for such purpose.

[fol. 278] Roy Purdue further testified as follows:

Affiant is familiar with the Sanford area in Hutchinson County, Texas, and with the gasoline plant of The Henderson Company and of the other companies in said area, and is familiar with the gas producing wells located in said area and in the vicinity of the plant of The Henderson Company.

That there are no sour gas wells in the Sanford area or in the vicinity of the plant of said company that are without connection at the present time, with the exception of two wells, which affiant is informed are owned by the Texoma Natural Gas Company; that all of the sour gas wells located in said area are now and have been connected for some years past to either the plant of The Henderson Company or to the plant of the Phillips Petroleum Company, which company also owns and operates a gasoline manufacturing plant at Sanford, Texas; that affiant knows of no available undeveloped sour gas acreage which is not now under contract with others, which can be obtained in the vicinity of the plant of The Henderson Company or the Sanford area; that the only remaining available sour gas areas in the West Panhandle field are located from ten to fifteen miles from the plant of The Henderson Company, and which are undeveloped.

[fol. 279] Affiant has seen and is familiar with the order of the Railroad Commission, dated September 25, 1935, termed, "Special Order fixing the allowable of sweet and sour gas wells in the West Panhandle field," and assuming such order to be valid, and for one to acquire sufficient gas acreage and drill sufficient wells thereon, bearing in mind the drainage unit fixed by the Commission, and the rate of production allocated to other wells, in order to obtain a total allowable production of 18,000,000 cubic feet or more, in affiant's opinion, would require one to purchase approximately 2,000 acres of leases at the present market value of approximately $10.00 per acre, and to drill at least four wells thereon, which would reasonably cost approximately $20,000.00 per well; that the total outlay for the leases and such wells would amount to at least $100,000.00; that the cost of the construction of a pipe line of sufficient size to transport such gas produced from such wells, at well pressure, would amount to at least $15,000.00 per mile. That in the opinion of affiant, if said order of the Commission be enforced and The Henderson Company thereby be required to buy leases, develop them and build a pipe line for the transportation of such gas to its plant in order to supply 18,000,000 cubic feet of gas or more per day to its said plant, said company would be required to expend a minimum of from $250,000.00 to $325,000.00.

[fol. 280] J. M. POWELL testified as follows:

That he is 32 years of age and resides at Pampa, Texas; that he is engaged in the business of gas engineering, and has been so engaged in such business in the Panhandle field, at Pampa and Borger, Texas, for nine years. That from November, 1930 to October, 1932, affiant was connected with the Independent Engineering Company at Pampa, Texas, in the capacity of field man; that the duties of affiant while so connected with the Independent Engineering Company were the testing of various gas wells in the Panhandle field as to their volume, rock pressure and hydrogen sulphide content, for various companies and operators owning and operating wells in said field; that in October, 1932, affiant severed his connection with the Independent Engineering Company and since said date has been employed by the Danciger Oil & Refining Company as engineer in its gas department at Pampa, Texas, and is now in the employ of said company.

That in September, 1931, affiant tested for hydrogen sulphide content various wells located on various leases connected to and under contract with F. C. Henderson, Inc., which owned and operated a casinghead gasoline manufacturing plant at Sanford, Texas; that affiant's records of actual tests made by him of the various wells and leases connected with the plant of said F. C. Henderson, Inc., as to the hydrogen sulphide content of such gas, made on September 5, 1931, are as follows:

Deal No. 1, located on the South 160 acres of Section [fol. 281] 81, Block 46, H&TC Ry. Co. Survey, 25 grains of hydrogen sulphide per 100 cubic feet of gas;

Texorado Oil & Gas Company No. 1 well, located on the North Half of the South 160 acres of Section 83, Block 46, H&TC Ry. Co. Survey, 22 grains of hydrogen sulphide per 100 cubic feet of gas;

Texorado Oil & Gas Company No. 2 well, located in said Section 83, 22 grains of hydrogen sulphide per 100 cubic feet of gas;

Gordon & Barnes No. 1 well (now the Polo Oil Company lease), located on the Southwest Quarter of the West Half of the North 80 acres of the South 320 acres, Section 83, Block 46, H&TC Ry. Co. Survey, 28 grains of hydrogen sulphide per 100 cubic feet of gas;

Reliance Development Company No. 1 well, located on the North Half of the Southeast Quarter of the Northwest Quarter of the North Half of the South 320 acres of Section 83, Block 46, H&TC Ry. Co. Survey, 27 grains of hydrogen sulphide per 100 cubic feet of gas;

R. A. Burnett-Oil Operators Trust No. 1 well, in Section 82, Block 46, H&TC Ry. Co. Survey, 35 grains of hydrogen sulphide per 100 cubic feet of gas.

R. A. Burnett-Oil Operators Trust No. 2 well, in said Section 82, 27 grains of hydrogen sulphide per 100 cubic feet of gas;

R. A. Burnett-McMann No. 1 well, located in Section 83, Block 46, H&TC Ry. Co. Survey, 32 grains of hydrogen sulphide per 100 cubic feet of gas.

[fol. 282] LAWRENCE R. HAGY testified as follows:

That he is 36 years of age and resides at Amarillo, Texas; that his profession is that of geologist; that he received his technical training at Oklahoma University, and graduated from such University, majoring in geology; that in 1923 he came to the Panhandle of Texas, and since said time has been located at Amarillo, Texas and has made an intensive study of the Panhandle gas field, its formation, the volume and character of gas contained therein. That in addition to his geological study of said field, he has engaged in the business of acquiring, developing and producing gas properties.

That from affiant's study of the Panhandle gas field, and from the knowledge he has obtained concerning the same, it is affiant's opinion that the Panhandle gas reservoir originally contained approximately 30 trillion cubic feet of gas in place; that up to the present time there has been approximately 5 trillion cubic feet of gas withdrawn from said reservoir, leaving approximately 25 trillion cubic feet now in place in said reservoir.

According to the Railroad Commission's records, the withdrawals of gas from the Panhandle field, both sweet and sour, to supply the present market demand for all purposes, including for light and fuel and carbon black manufacture, is 985 million cubic feet per day. That, upon the basis of the present market demand for all purposes, the re-

maining gas reserve in said field would supply such market requirements for seventy years.

[fol. 283] J. H. Mann testified as follows:

That he is 54 years of age and resides in the City of Pampa, Gray County, Texas, and is engaged in the business of carbon black manufacture; that for the past thirty years he has been engaged in the construction and operation of carbon black plants; that he has constructed and operated carbon black plants in the states of Pennsylvania, West Virginia, Louisiana and Texas; that for a number of years he was manager of the Imperial Oil & Gas Company's carbon black plants in the Monroe field of Louisiana. Later, he constructed and operated the carbon black plants of International Gas Products Company of Monroe, Louisiana, and at the present time is president of Better Blacks, Inc., which company owns and operates a carbon black plant near the town of Lefors, Gray County, Texas; that during his many years of experience in the carbon business, he has had occasion to become familiar with and acquire knowledge concerning all phases of the carbon black industry and has made intensive study with reference to the construction and operation of carbon black plants, the chemical constituents of gas, which is the only product yet known from which carbon black can be manufactured, and the methods and processes used to obtain carbon from natural gas.

Affiant states that the principal uses for carbon black are as follows: printers' ink, automobile tires and other rubber products, paints, varnishes, la-quers, stove polish, shoe [fol. 284] polish, carbon papers, typewriter ribbons, black and gray paper, book binders' board, crayons, golf balls, tarpaulins, insulating material, phonograph records, cement, tile, and artificial stone. That before the use of carbon black, lampblack was the common coloring material for inks, paints, varnishes and la-quers, but because of the more intense color and greater tinting strength, carbon black has practically supplanted lampblack in inks, and has wholly supplanted lampblack in printers' ink, used universally today by the great newspapers of the world, as carbon black is the only product from which a free-flowing

ink can be manufactured permitting rapid printing as is done on the giant rotary presses employed by the modern newspapers. Ink made from carbon black is used, not only by publishers of newspapers and magazines, but also by the printers of Bibles, school books, law books and works of general information and literature. Carbon black therefore is the vehicle or medium by which the dissemination of news and instruction throughout the United States is at present accomplished. According to the United States Department of Commerce, there were, in 1925, in the United States, 22,725 printing and publishing establishments, employing 296,324 wage earners and having an output valued at $2,482,000,000.00. There were over 20,000 daily and weekly newspapers. The circulation of daily newspapers alone was 38,039,682 copies per day, or one copy for every three persons in the United States. One of the principal commodities upon which the future of such businesses depends- printers' ink can only be made from carbon black. [fol. 285] The most important use for carbon black, measured by volume of the product, is in the manufacture of rubber. Carbon black was first used as a coloring agent in the manufacture of rubber, about the year 1915. Several years thereafter were consumed in experimenting with carbon black in the manufacture of rubber, when it was discovered that carbon black, when mingled with the rubber compound, acts as a reinforcing agent, toughening the rubber, increasing its tensile strength, minimizing punctures and blowouts, and prolonging its durability and service. Around fifteen years ago, carbon black began to supplant zinc oxide in the manufacture of automobile tires, and in the last ten years has completely supplanted the use of zinc oxide in such manufacture. In 1924, there were something in excess of 46,000,000 automobile tires, and 44,000,000 automobile inner tubes sold in the United States. For these automobile tires and tubes the American public paid not less than $700,000,000.00. The use of carbon black in the manufacture of automobile tires has increased the life of such tires until today the automobile tire, in which carbon black is used, will last, in ordinary service, from three to four times as long as the automobile tire manufactured prior to the use of carbon black in such manufacture, and thus, the use of carbon black in the manufacture of automobile tires alone, saves the American public, conservatively estimated, more than $2,000,000,000.00 per year.

The carbon black industry in 1920 was in its infancy. Comparatively little was known then as to what is known [fol. 286] today of the paramount importance of carbon black and its manufacture. Great as has been the progress made in the carbon black industry, in the last fifteen years, it is perhaps still in its childhood, as its absolute necessity for the wellbeing of the general public is realized more and more each year, and as its range of utility widens from year to year. There is, perhaps today, no other single product with such a wide range of utility and which is so necessary for the wellbeing of the public generally, as is carbon black.

As the carbon black industry, in the last few years, has grown, so has the efficiency of its manufacture increased. A few years ago, carbon black was merely carbon black. With constant experiment with its use, it has been discovered that better grades of carbon black are necessary to produce finer and better products and commodities, in which carbon black is used. Therefore, in the last few years, the users of carbon black required that the carbon black they purchased have certain specifications, until today practically all carbon black is manufactured according to the specifications prescribed by its users. Thus, with the demand for better qualities of carbon black, came more efficient processes and improved equipment for its manufacture, until today the modern carbon black manufacturing plant, in fulfilling the specifications of the users to whom it sells its output, recovers all of the carbon black in the gas capable of being recovered.

In the manufacture of carbon black, heat is required [fol. 287] to break down the chemical constituents of the gas and to separate the carbon from the other elements contained in such gas, and the amount or degree of heat is dependent upon the grade or quality of the manufacture. That in the present day manufacture of carbon black, according to the specifications commercially required, where the recovery is to the extent of around 1-1/2 pounds per thousand cubic feet, all of the heat units contained in the gas used for such manufacture are actually applied and utilized for the purpose of generating heat used in the manufacture of such carbon black, and not only is there no waste of gas in the manufacture of carbon black, but in addition thereto there is no waste of the heat units contained in such gas in the manufacture of carbon black, and

the heat units contained in gas used for the manufacture of carbon black are so efficiently utilized and applied for such manufacture as the heat units in gas are applied and utilized for the purpose of boiling a pot of beans on the ordinary domestic cook stove, where gas is used for generating heat for such purpose. There is no difference in the comparative use of such gas. In the one instance, the finished product is carbon black, in the other, cooked beans.

Affiant further states that it is possible to recover somewhat more than 1 1/2 pounds of carbon black per thousand cubic feet of gas, but that such carbon black, where the recovery is in excess of such amount, is not usable for the purposes for which carbon black today is being utilized; [fol. 288] that in the manufacture of carbon black the smaller amount recovered is the finer quality of black, and hence, correspondingly, the more valuable; that the recovery of carbon black up to 1 1/2 pounds per thousand cubic feet is the most efficient recovery known to the carbon black industry today, and is the only recovery that is commercially profitable. Theoretically, it might be said that in the present day manufacture of carbon black some of the carbon black content in the gas is lost, but actually, this is not true, for the reasons explained above. Likewise, it might be said that loss or waste occurs in the ordinary and usual use of gas for the purpose of generating heat, as for instance, on simple a contrivance as a gas range has been shown to have a cooking efficiency of only 12 per cent, and many gas engines have a fuel efficiency of as much as 30 per cent, while the fuel efficiency of many steam engines runs as low as 1 per cent. Or, for instance, take the case of the incandescent electric light, which has engaged the attention of the best engineering brains for a generation, yet the amount of heat energy in the fuel actually consumed in light, where gas is used, is less than 2 per cent.

[fol. 289] Howard W. Price testified as follows:

He is forty seven (47) years of age and that he lives at Borger, Texas, and that he is a mechanical engineer and that he has been practicing his profession as a mechanical engineer for twenty four years, and that for the fifteen (15) years last past he has been actively engaged

as engineer and general manager of the carbon black manufacturing plants of the J. M. Huber interests located in Louisiana, Texas and Wyoming.

That he graduated at the University of Missouri, with the degree of Mechanical Engineer in June, 1911, and during the time he has been associated with the Huber Interests, he has not only had general charge of carbon black manufacturing, but also the design and construction of carbon black plants; also, has been in charge of oil and gas well drilling in Louisiana and Texas and in the production of natural gas, and has made a study of the chemistry of natural gas and the method and means of measuring and burning the same.

That as to the inception and history of the carbon black industry, affiant further states that at a recent meeting of the Mid Continent District of the American Petroleum Institute, that in conjunction with R. C. Allen and E. B. Reinbold, he prepared a paper for said Institute concerning the history and development of carbon black.

[fol. 290] That for the sake of brevity a copy of that paper is attached hereto. That the fact statements contained therein are true.

That said paper was published in the Oil & Gas Journal of June 27th, 1935, Page 93; that it was published in the Refiner & Natural Gasoline Manufacturer of August, 1935, Page 384 of said magazine.

Affiant further states that approximately 50,000,000 dollars is now invested in carbon black plants in the State of Texas; and that this represents approximately 85% of the total and present investment in carbon black plants in the United States.

That outside of the United States there are only two small carbon black plants in the world, one being located on the Island of Formosa and the other in Southern Russia.

Affiant further states that the only supply of sour gas, containing Hydrogen Sulphide, from which carbon black can now be lawfully made, is located in the Panhandle of Texas.

Affiant states that from a carbon black manufacturing standpoint, there is no practical difference between sweet gas and sour gas; their chemical constituents are practically the same, insofar as the recovery of carbon is concerned. The presence of hydrogen sulphide in sour gas does not affect the production of carbon black from the gas

either one way or the other; in fact, sweet gas can be more economically used in the manufacture of carbon black than sour gas, for the reason that the presence of hydrogen sulphide in sour gas has a deteriorating effect upon the carbon black plant itself. The extent of injury to the plant [fol. 291] equipment depends upon the amount of hydrogen sulphide in the gas; therefore, considered from a true economical standpoint, there is economically less waste in manufacturing carbon black from sweet gas than from sour gas.

There is no physical waste of gas in the manufacture of carbon black. The reason for this being that in any process of taking carbon from its chemically combined hydrogen, it is necessary to supply heat. In the manufacture of carbon black, the gas is used for both this necessary heat and as a source of raw material, and by regulated partial combustion the carbon is largely separated by the heat of the flame, with hydrogen and some carbon being consumed in the process. We, therefore, have in the manufacture of carbon black a process which requires a fuel to develop heat to break down the gas in its component parts.

To compare with the smelting industry, wherein the source of raw material is an ore: We may have an abundance of natural gas, either sweet or sour, and in any quantities for the reduction of this ore, just so long as the cost of the gas producing this heat is in economical relation with the price of the product produced.

Under the present gas law, we cannot be permitted to use sweet natural gas for the development of the heat necessary, were it not for the physical impossibility of determining how much heat was required due to the fact that the gas as consumed is also the source of the raw [fol. 292] material for the manufacture of the black itself.

As referred to in the article attached, there have been processes developed in which the gas was thermatically treated by means of external heat. While this showed a much higher recovery on the gas which is actually being consumed, the quality of the product is unsuitable for use with rubber which constitutes over 90% of the [illegible] of carbon black. The Channel process has still been the only satisfactory process to produce a product suitable in the rubber trade, and the machines and methods have been developed to a very high state where there is no waste of the gas in the manufacture of carbon black.

Thus we see that in the manufacture of carbon black, we have a unique situation and one that probably does not exist in any other manufacturing industry, in that gas which is consumed is both the raw material out of which the product carbon black is manufactured, and at the same time certain elements of the gas while going through the process of manufacture are consumed as fuel in the necessary heating to liberate the carbon present.

[fol. 293] Exhibit Attached to Affidavit Dated Aug. 23, 1935

For Release April 10, 1935

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Paper No. 851-9E

The History, Use and Manufacture of Carbon Black by R. G. Allen

Cabot Companies, Pampa, Texas and H. W. Price and E. B. Reinbold

J. M. Huber Corporation, Borger, Texas

For Presentation at the Spring Meeting of the Mid Continent District, A. P. I. Division of Production

Herring Hotel, Amarillo, Texas

April 10-11, 1935

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Mid Continent District

[fol. 294] Paper No. 851-9E

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The History, Use and Manufacture of Carbon Black by R. G. Allen*, H. W. Price and E. B. Reinbold**

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* Cabot Companies, Pampa, Texas.

**J. M. Huber Corporation, Borger, Texas.

History

Some may think that a discussion of the carbon black business at an A. P. I. meeting is inappropriate. The production of carbon black is purely a manufacturing process. The intimacy of our connection with the petroleum industry is founded on the coincidence of the fact that our raw material supply and our fuel are one and the same material natural gas. This makes it necessary for us to locate in the heart of an oil field, where natural gas is available in abundance. For this reason we will probably continue to be your close neighbors for some time to come, and, to that extent, our problems will be yours.

Although we recognize the fact that most of you are primarily interested in the problems of the manufacture of carbon black, we think that a short summary of the history of the industry would provide an interesting background for the subsequent discussion. Although soot in various forms has been known and used since the beginning of time, carbon gas black was first manufactured in the year [Vol. 295] 1864 by J. K. Wright, a Philadelphia ink maker. At that time the price was from $2.00 to $5.00 per pound, and while the usefulness of the product was appreciated, the price was so exorbitant that it was impossible to extend its use or even to make its use a popular one. Construction of additional plants in Pennsylvania, Ohio and West Virginia brought the price down to 5¢ per pound.

The next eighteen years saw enormous development in the technique of manufacture; hundreds of patents were issued, many of them worthless, but some two or three of which proved extremely valuable and are the basis of the processes now in use.

At the beginning of the twentieth century there was a production of about twenty thousand pounds per day, and the price had already dropped to 2¢ per pound. A factory had been started at Granteville, West Virginia which had the wizard of and unbelievable production rate of 21,000 pounds per day. For fifteen years this plant, which today would be of small importance, remained the largest in the world.

Use

In 1915, on account of the World War, the price of gas black went so high as to make its use prohibitive in rubber

compound. It was then that rubber chemists instituted a search for other compounding ingredients that might be used in the manufacture of rubber products, principally tires, and it was then that the value of carbon black as a pigment in rubber was discovered. An English company [fol. 296] is given credit for first ascertaining this valuable property and jealously guarded their secret by buying their carbon black requirements through a chemical company.

Although one American manufacturer had announced a black tire during 1915 and the black Silvertown cord appeared in 1916 and were for a short time unique, other tire companies immediately took up the use of carbon black, and soon there developed a serious shortage. In spite of frenzied building of plants, particularly in Louisiana, prices mounted to over 20¢ per pound, but the shortage continued until 1924.

Carbon black, when compounded into rubber, doubles its tensile strength and quadruples its resistance to abrasion. No doubt, there are many other substances which would have these same qualities in rubber if they could be found or could be ground to the microscopic size of the carbon black particle. It is so fine that the highest powered microscope has been unable to shed any light on its size or particle shape, and its size is only estimated by indirect methods of chemical calculation to be approximately one-five hundred thousandths of an inch in diameter.

There has been much advance over the past several years in tire compounding and building, but carbon black stands alone as an indispensible ingredient in increasing the strength of the rubber compound, and added tremendously to tire mileage due to its added abrasive resistance. In every set of tires for a medium size car there is approximately one standard package of 12½ pounds of carbon black compounded into these tires, for in standard com- [fol. 297] pounding of rubber for tires there is 50 pounds of carbon black added for every 100 pounds of crude rubber used.

Carbon black producers built first in Texas in the vicinity of Breckenridge and shortly thereafter moved into the Texas Panhandle where, at the present time, is produced approximately 76% of the total quantity manufactured in this country, or rather in the world, because, with

the exception of small plants in Japan and Russia, the world's supply of carbon black comes from the United States. Carbon black has been produced in thirteen states during the life of the industry. At the present time only Louisiana, Texas, Oklahoma and Wyoming have plants in operation.

At present approximately 35% of all carbon black sold is exported. Under the stimulus of existing low prices, users are now loading black into their rubber stocks more heavily than heretofore and are to an increasing extent substituting carbon black for lamp black in ink and paint. It is to be hoped that such additional market outlets as have been developed during the recent period of disastrously low prices will not be lost when the price of carbon black has returned to a profitable figure.

During the past several years the average use of carbon black has been approximately 260,000,000 pounds, approximately 80% of which has been used in the rubber industry. The value of this product has never exceeded $20,000,000.00, and at the current price and current rate of production, it can scarcely exceed one-half of that.

[fol. 298] The role of carbon black is familiar to many of you. Its value as a reinforcing pigment in rubber has saved hundreds of millions of dollars in the world's tire bill. Many of you are aware of the fact that the modern newspaper would be very expensive, if not impossible to accomplish, if it were not for the modern, high speed printing press, the successful operation of which is dependent solely on the use of a free flowing, highly opaque, mixture of varnish and oil plus carbon black called ink. Carbon black is the only known pigment which will provide sufficient opacity or hiding power in concentrations which are so small that the free flowing properties of the vehicle are preserved. Few manufactured products are so indispensable to the industries in which they are used.

Manufacture

In the manufacture of carbon black, or more technically speaking, channel gas black, the product is produced by the partial combustion of natural gas, the gas issuing from a tip or orifice within an all metal house having restricted supply of air, and the lazy flame produced striking a chilling

plate, usually a channel, to which the freed carbon of the flame sticks and is there deposited.

Carbon black is always referred to as a product made from natural gas and should not be confused with lamp black which is the result of incomplete combustion of oil in which production the smoke is collected and deposited in large room settling chambers usually of brick construction, [fol. 299] and the different grades are derived from the distance that these small particles of black are carried in an air suspension from the source of combustion. Lamp black is used almost wholly as a pigment for color purposes, principally in paints and solid carbon compounds, and while it appears similar to that of carbon black, is, generally speaking, not an interchangeable pigment.

Various Types of Plants to Produce

By far the largest quantity of carbon black is manufactured by what we term the channel process. It is so called from the fact that the gas, when burned from various types of lava tips, is projected against the under side of standard steel channels, either of seven or eight inch widths, where the black is collected. These channels, within the burning houses, commonly called hot houses, are bolted together, forming a grid, with the channel edges turned up and these are suspended by means of cross channels or angles across the ends of which are bolted or welded two angles, serving as the support of flanged wheels which run on a track and support this channel grid. The channel grid is then moved longitudinally in the hot house a distance of from four to eight feet, above the gas flames, which are stationary, and in the process of this reciprocating motion, hoppers and scrapers are so placed that the scrapers remove the surface deposit allowing it to fall within the hopper, and then by means of a screw conveyor it is automatically and continuously removed from the hot-houses into a central alley [fol. 300] where it is again picked up by a larger conveyor and conveyed to the bolting and packing house.

Within the hothouse and located between each collecting hopper are burner pipes, usually one or one and one-fourth inch, which lie approximately two and one-half inches below the channels and parallel to them and have placed in this burner pipe, at a distance of approximately every four

inches, an old fashioned bone burner tip, from which the gas issues and burns in a lazy flame and in an atmosphere of insufficient oxygen to form complete combustion.

For convenience of operation bothouses are placed in two rows with a space of from 15 to 20 feet wide between them called an alley. This alley contains the two railroad tracks for conveying the black to the packing house, also contains the drives necessary for the bothouse conveyor scrapers, also the drives to operate racks and pinions which operate the chamels to move back and forth within the bothouses. A few years ago a factory equipped at 20 horse power per unit but 5 years there have been stepped up to 40 horse power per unit, and with some bothouses as much as 60 horse power combined conveying into one packing house.

As another form of channel factory we might [illegible] disc or wheel type plant which is now almost obsolete, but there are still some in operation. This type of plant is similar to the channel in all respects except that the black is deposited on a circular disc 30 to 40 inches outside diameter and 6 to 8 inches wide, and operates slowly in one of several [illegible] The discs are arranged in the bothouses in two, three or four rows and have the advantage of necessitating only one scraper per disc and a much smaller hopper. However the complication of driving the discs in the various rows coupled with small capacity for the size of the bothouses are the principal drawbacks.

A third type of factory is that in which equal rollers are used on which the black is deposited and from which it is scraped, every roller usually being put above or in the enclosing hopper. Each bothouse then contains a series of these roller combinations which are usually about 12 inches in diameter and 4 to 6 feet long, and have one to two rows of tips underneath them. The black produced in this type of factory has several peculiar characteristics for which the demand is limited.

In addition to the three types of factories just mentioned there are four other types, namely, Restricted Combustion, Continuous Cracking, Batch Cracking and Electrical Cracking. The restricted combusted type operates by burning gas with an insufficient amount of air in a large furnace, usually about 12 feet in diameter and twenty feet high. The smoke from this furnace is then collected by means of either

bag filtration or is thrown down by means of water sprays, the slug of which is then filter pressed, dried in an indirect rotary drier and broken down by grinding.

In continuous cracking raw gas is cracked by means of being subjected to reflected heat or by being passed over continuous flames without the addition of any air.

[fol. 302] The batch cracking is that of heating up a checker work brick furnace by means of burning gas underneath the bricks until a temperature of about 2300 degrees F. is reached, then raw gas is admitted at the top, allowed to flow down over the heated brick-work, wherein the gas is cracked, producing hydrogen and carbon.

The electrical cracking method, which is yet in the experimental stages, has successfully cracked gas, but more successfully cracked oil, in the vapor or liquid state. If oil is used this is thrown down as slug and must be filtered, pressed out of the oil, dried and ground.

The black made under these four last processes has characteristics peculiar to each method, but is not commercially in direct competition with the more common channel black.

Construction of Plants

The materials of construction of practically all of the plants are derived from standard steel shapes, standard channels being used for the collecting surfaces and angles or channels used for supporting this collecting grid. The frame-work of the hothouses is made out of material with 1, $1\frac{1}{2}$ or 2 inch standard angles, this frame-work then being covered with standard, painted, V crimped sheet iron. The piping used is generally that of plain steel pipe, with the exception of where hydrogen sulphide is encountered considerable success has been had in the use of calorized pipe especially for burner pipe in which the tips are located.

[fol. 303] It has been the custom of various manufacturers to fabricate and erect their own factories and up to the present time there has been no design that could be said to be standardized, as each manufacturer has varied considerably, except all plants are basically the same in principle. It was the custom, originally, to fabricate and erect entire factories by means of bolts and rivets, but many of the later factories are completely welded, mostly by means of the electric arc.

In all of this construction considerable attention must be given to providing for expansion joints, as the temperature within the hothouses is usually around 400 degrees F. at the floor, approximately 1000 degrees F. around the channel grid and from 400 to 500 degrees F. at the roof outlets. There have been many different plans used for drafting the factories to control the limited supply of air uniformly throughout the houses, some excess air must be provided to keep the temperature within operating limits.

Gas Distribution

The gas distribution to provide each burner tip with a uniform pressure over a factory covering several acres presents an interesting problem and in general is handled in one of two ways. The first method employed was to reduce the field pressure by means of standard, weighted, reducing valves down to 3 or 4 pounds and this was passed into a large bell jar gasometer type regulator, in which the bell floats on water or oil. The floating of the bell was then used to control a butterfly valve, reducing the pressure [fol. 304] to 6 or 8 inches of water. This was then distributed to the factory through a loop of 10 inch pipe, joining in several places to a loop of 8 inch pipe going around each group of hothouses and into this 8 inch pipe were welded 4 inch nipples with 4 inch valves, controlling two runs of 4 inch pipe the full length of each hothouse, which served to distribute the gas to the burners, as well as form the support for the burning channels and operating mechanism. In this final distribution the gas dropped from the gasometer pressure to a pressure of about 2 to 3 tenths inches of water at the tips.

A second method of distribution is that of running a large gas main down the central alley between the burning houses and controlling the pressure in this line by means of weighted regulators to from 1 to 15 pounds and then by the use of a single 4 inch pipe extending back through the center of the hothouse, controlling the flow to each house by means of an individual flow meter and small riser pipes from this general distributing pipe to each burner section. Each method accomplishes the same results. The former method requiring a much larger investment, while the second method requires more supervision.

Operation and Handling

The operation of the hothouses is continuous over long periods of time, except when necessary to close down for [fol. 305] cleaning and repairing. This is done in individual houses and seldom is a factory down completely.

It may be of interest to many how the lubrication of all of the moving parts is provided for, due to the high heats developed and due to much of the exposed machinery. Where the heat is high, that of the burner grid, no lubrication is necessary, as the burner grid support is carried on the axis of a large number of flanged bearing wheels, which themselves run upon a steel track. This give us rolling friction only, with very little wear resulting. The bearings in the alleys are either plain babbitt or roller type, the plain babbitt type usually lubricated by means of bottle or wick oilers and the roller type by means of compression grease. While carbon black seems to possess little or no lubricating properties, such as graphite, yet in its dry state it serves as a very effective lubricant for the bearings which support the many feet of screw conveyors necessary to handle the black.

As has been mentioned, the conveying of black is principally done by screw conveyors, which operate at comparatively low speeds, seldom ever over 30 r. p. m. and due to the slip back of this type of conveyor, it requires from 2 to 3 hours to convey the black from the furtherest end of the nearest hothouse into the packing bin. In handling black within the packing house this is done by means of vertical conveyor screws, inclined or vertical bucket elevators and by means of the air lift.

The black upon reaching the packing house is always bolted or sifted in various ways to eliminate foreign matter [fol. 306] and break up the flakes formed on the channels. Bolting processes usually take one of the following forms: Brushing through a screen by rotating brushes; passing through an attrition mill where a highly revolving set of blades or bars break up the black and force it through a fine screen; blowing the black through a screen by the use of a fan or air blast and by air flotation.

The black, on being bolted, in one of the above forms, next is conveyed to a large bin in which it is agitated by various means to reduce its volume-weight relationship sufficient that it can be packed off in paper bags with a

standard screw packer such as is used for sugar and flour.

As is well known, black is one of the lightest of our known pigments. In the state in which it comes from the bothouses it weighs about 4 pounds per cubic foot. Usually the bolting process further increase its volume to where it weighs but 2 or 3 pounds per cubic foot. Agitation within the bins then reduces this to about 2 pounds per cubic foot as it is packed off in bags for commercial use. Two sizes of packages are used, the smaller one containing 12½ pounds, requires a satchel bottom bag 17½ x 34 inches, and the larger size bag is 22 x 38 inches, holding 25 pounds. If the black is to be used in the rubber industry it is usually compressed by means of mechanical plunger type presses or hydraulic presses to half the above volumes. This compressing briquetts the black so that it is easier to handle and occasions less dusting in use. To minimize dusting in [fol. 307] handling, the black is always overslipped, using a second bag slightly larger than the packing bag. In the case of compressed black this overslip is made small and is put on as the package comes from the press. Domestic shipments are usually made by stacking the black directly in a car after the car has been paper lined to reduce abrasive friction. Foreign shipments, however, are usually made in wooden or fiberboard cases containing from 150 to 325 pounds net each.

A very recent development in the processing and handling of black has been to produce what is commonly known as dustless black. Black is taken either from the bolters directly, or from the agitating bins, and processed in such a manner as to produce spherical or granular pellets of a size which will pass through a 20 mesh screen, but will be retained on from a 65 to a 100 mesh screen. These small pellets are agglomerated carbon black in which each particle has been compressed in the treating process such as to adhere together sufficiently that the product can be handled in bulk with little break down forming dust. This product has the same volume weight as the hydraulically or mechanically compressed carbon black, and finds its use principally in rubber. It has the further advantage that while a great deal of it is still packed for shipment in bags, yet it lends itself readily to being conveyed by standard conveying machinery which enables it to be shipped in bulk in tank cars, and handled in the receiving plants in dustless

systems, resulting in cleaner processing and minimizing labor of handling.

[fol. 308] The question is often asked regarding the inflammability and fire hazard in the handling of black. It would appear to some that the black would, in all probability, be explosive and dust explosions would result. However, there has been no record of such a thing happening. Carbon black being composed entirely of pure carbon, will burn, and is often times set on fire by friction of bearings in the agitation bins or by friction of flights in the packers, and black has been known to stay on fire several days within a paper bag before coming to the surface. It will not burn with an open flame or blaze, but only with a reddish glow consuming the oxygen contained between the particles of black. The production of combustion is very largely carbon monoxide and in fighting a carbon black fire workmen should guard themselves against too much exposure to the fumes if in a closed building.

The compression of carbon black, however, eliminates practically all fire danger, as we have many times tried the experiment of setting the black on fire in a bag and then putting it in a press and we have found that this always extinguishes it completely, so that storage black in general presents a very small fire hazard.

Testing of Black

Carbon black is subject to several rather rigid tests, depending upon the use to which it is put. Due to the fact that factories are constructed mechanically different, operate with a variety of different kinds of tips under different tip height distances and amounts of gas, coupled with the fact that gases themselves vary as to different fields and dif-
[fol. 309] ferent sources of supply within the fields, black varies a good deal in its physical characteristics and we are gradually developing better and more accurate testing procedures to be able to evaluate the various grades.

Practically all grades are subjected to a residue or grit test. The present standard for rubber blacks in this are that a black should not contain more than 1/10th of 1 per cent of residue when washed through a screen of 325 meshes to the inch, which screen has openings of only 17/10,000ths of an inch.

In pigment work, color and flow are given primary consideration. If it is to be used for a lacquer or varnish it is evaluated on the intensity of true color, while if it is to be used in a body pigment, then it is considered on a basis of tintorial strength. It is interesting to note that practically all blacks, which when wetted with oil or clear varnish show up as intensely black are correspondingly weak tintorially, while a brown or gray black is usually fairly high in pigmentation.

The flow of black refers to its ability to absorb and hold in suspension varying quantities of mineral oil or varnish and is an index of its usability in the printing and paint trades.

Since the larger percentage of black goes to the rubber industry, the test for its characteristics when milled into [fol. 310] rubber are probably the most elaborate. Practically all of the companies manufacturing black now are equipped with complete rubber testing laboratories in which a certain amount of black is ground on a rubber mill into crude rubber and other ingredients according to several test recipes. This stock is then sheeted out and placed in molds and vulcanized for various length of time, from 10 to 90 minutes. From these sheets, which are approximately 1/10th of an inch thick, is cut out a dumb bell, which is stretched to its breaking point on a Goodyear or Scott tensile machine and from this test, coupled with the standard tear test, abrasive test and penetrometer test, various blacks can be selected to fit into the requirements of the several rubber manufacturers.

Physical Hazards

It would seem, from the way compensation insurance rates have been raised in Texas, in the last few years, that the hazards of operation were considerable. This is not, however, a true index, because the rise of these rates is largely due to the construction priods in which large numbers of unskilled and unaccustomed workmen are employed.

The hazards of straight operation, however, are very small and most manufacturers are constantly improving the guarding of their various pulleys and shafting so as to [fol. 311] make major accidents almost negligible.

By those unaccustomed to the manufacture of black, and at first seeing the workmen almost covered with it, the question is usually asked if it is not injurious to health. There have been a good many men, however, employed constantly for a period of ten years in packing black, wherein the dust is probably the worst, with no detrimental physical effects noticed.

It is true that some is breathed into the lungs, but due to the fact that carbon black is not abrasive and is perfectly inert, there have been practically no known cases of it being detrimental to one's general health.

[fol. 312] H. H. Reamon testified as follows:

"I am fifty two (52) years of age, and a resident of Monroe, Louisiana. I have lived in Monroe, Louisiana for sixteen (16) years. I am the General Superintendent of the Columbian Carbon Company, which owns and operates carbon black plants for the manufacture of carbon black from natural gas, in the States of Louisiana and Texas, one of which plants the company operates for the manufacture of carbon black, located about three miles north of the plant of the Portland Gasoline Company, in Gray County, Texas, known as its Kingsmill plant, which plant was formerly operated under the name of Western Carbon Company. I have been in the employ of the Columbian Carbon Company and its predecessors about twenty years. I have held the position of General Superintendent for the past ten years. As such General Superintendent I have charge of the construction and entire operations of the carbon black plants, except the sales of the products thereof. From my many years of experience and wide range of my experience in the erection and the operation of carbon black plants in the States of Texas and Louisiana, I am thoroughly familiar with all phases of the industry, the type of processes used in the manufacture of carbon black and the chemical constituents of gas from which carbon black is manufactured. Columbian Carbon Company purchases its full requirements of gas for its Kingsmill plant from the Portland [fol. 313] Gasoline Company, which requires for the operation of its plant from 21,000,000 to 22,000,000 cubic feet of gas per day for its use.

Through many years of experience in this business, I consider myself an expert in matters pertaining to the production of natural gas and its manufacture into carbon black which is a commercial product used throughout the world and is indispensable to the needs of mankind.

About eighty per cent of the carbon black produced is used as an ingredient in the manufacture of rubber, particularly in automobile tires, this use having started about 1915 when its purpose was for coloring the rubber. Prior to that time tires as a rule were white or red, with an average life of about 5,000 miles. Now because of the general use of carbon black in tire treads the average life is from 15,000 to 30,000 miles. This increased durability has saved motorists millions of dollars besides increasing the safety of motor travel. Domestic consumption in the manufacture of rubber has grown to approximately 190,000,000 to 200,000,000 pounds of black annually. It is used in all kinds of rubber but principally in tires.

Another important use of carbon black is in the manufacture of inks, about ten per cent of the total being used for this purpose, in which, according to the United States Department of Commerce, it has practically supplanted lamp black. This has made possible the high speed printing presses in use today. [fol. 314] While the consumption of carbon black in printer's ink is not relatively large, it is particularly important, as no other known product will replace it. One pound of black, mixed with eight pounds of oil, gives enough ink to cover nearly an acre of surface, which no other coloring material can approach.

The third important use of carbon black is as a coloring agent in paints, varnishes, and lacquers, about five per cent of the total being so used. The other five per cent manufactured is used in various products, such as shoes, stove polish, phonograph records, artificial stones, crayons, and carbon paper.

The United States Bureau of Mines annually publishes statistics in connection with the production and sale of carbon black, which show that, for the past four or five years, the average yield has been 1.43 pounds of black per thousand cubic feet of gas. The average yield of the plant of Columbian Carbon Company in Gray County, Texas, obtained from gas purchased from Portland Gasoline Company, is in excess of one and one-half (1½) pounds of black

per thousand cubic feet of gas, which would indicate that the efficiency there is better than the average.

I am acquainted with the Panhandle gas field and the character of gas being produced in said field, from both the so-called sweet and sour areas; that from the carbon black manufacturing standpoint there is no practical difference between sweet and sour gas; their chemical constituents [fol. 315] are the same, insofar as the recovery of carbon is concerned. In fact, sweet gas can be more economically used in the manufacture of carbon black than sour gas, for the reason that hydrogen sulphide has a deteriorating effect upon the carbon black plant, and considering the matter from a purely economical standpoint, there is less waste in manufacturing carbon black from sweet gas than from sour gas.

There is no physical waste of gas nor of the heat units contained therein in the manufacture of carbon black. In any process of taking carbon from its chemically combined hydrogen it is necessary to apply heat, and in the manufacture of carbon black all of the heat units or B. T. U. content in the gas from which carbon black is being manufactured are actually utilized to generate heat to break down the gas in its component parts. Thus, in utilizing gas for the manufacture of carbon black, such gas is actually used for fuel purposes, just the same as gas may be used in smelting ore or manufacturing steel as in many other manufacturing processes where gas is used as a source of heat in order to produce the manufactured product. In the latter instance the raw material from which the product is manufactured is separate and apart from the fuel used to apply heat to such raw materials in order to produce the manufactured product. In the former, the fuel used for generating the heat for manufacturing the product—which is carbon black—likewise contains the raw materials from which the carbon black is manufactured.

In the manufacture of carbon black today, the channel process is universally employed and the industry does not [fol. 316] know of any other process that will obtain more carbon black from the least amount of gas to meet the specifications and requirements of the users of carbon black, and particularly rubber and ink manufacturers, which utilize more than ninety per cent (90%) of the entire production of carbon black. Various experiments have been

made with other processes and there are a few small plants employing other processes for the purpose of obtaining carbon from natural gas, in which the recovery ranges from eight to twelve pounds per thousand cubic feet, but the product manufactured in these plants is not carbon black, does not meet the requirements and specifications of the manufacturers of automobile tires and printers' inks, and the field of utilization for this character of carbon produced is very limited.

Theoretically, under atmospheric pressure and 32° Fahrenheit one thousand cubic feet of gas should contain approximately thirty pounds of total carbon, but practically, this thirty pounds of total carbon will only produce about one and one-half pounds of carbon black. If it were possible to extract all of the element carbon from natural gas such product extracted would not be carbon black and it would have no commercial value or utility whatever. Thus, it is obviously erroneous to say that, because a thousand feet of natural gas theoretically contains thirty pounds of total carbon and the recovery of carbon black from a thousand feet of gas is only one and one-half pounds, therefore the manufacture of carbon black is only [fol. 317] five percent (5%) efficient. To talk in such abstract terms is to consider the element carbon and the pigment called carbon black as one and the same product. They are vastly different and of course cannot be compared in any sense as to quality, utility or commercial value. The product carbon black is as different from the element carbon as high grade steel is from the ore from which it is manufactured.

In the present day manufacture of carbon black thru the channel process the most up-to-date methods, equipment and appliances are used for the purpose of recovering and saving all of such product; that in such manufacture no appreciable amount of carbon black is lost or permitted to be wasted, and in this connection, only an infinites-mal quantity of carbon black actually escapes into the air during manufacture, such amount is so small that any attempted recovery from the smoke going into the air would be entirely economically unjustified.

[fol. 318] E. B. Reinhold testified as follows:

My name is E. B. Reinhold, and I reside at Borger, Texas. I am a chemical engineer, having received my technical training at Muhlenberg College, Allentown, Pennsylvania and Cornell University, Ithaca, New York; I received the degree of Bachelor of Science in Chemistry from Muhlenberg College in 1926, and the degree of Master of Science in Chemistry from Cornell University in 1928. From 1928 to 1930 I was employed by B. F. Goodrich Rubber Company of Akron, Ohio, as chemist in the technical department of such company, doing research and development work. Since 1930, I have been employed by J. M. Huber Corporation in the capacity of chief chemist, having charge of the chemical laboratories of such company, which company owns and operates carbon black plants in Louisiana, Texas, and Wyoming.

I am familiar with and have given a great amount of study to the various processes used in the manufacture of carbon black, as well as those processes with which experiments have been made in attempts to manufacture carbon black. I am familiar with the chemical constituents of gas, and particularly the gas being produced from the Panhandle field of Texas, and likewise am familiar with the chemical constituents of carbon black manufactured from natural gas, and also the chemical constituents of the [fol. 319] vapors and gases given off into the air by carbon black manufacturing plants during the process of manufacturing carbon black. I am further familiar with the chemical reactions of carbon black and the utility of such product when used in rubber compounds for the purpose of manufacturing automobile tires and other rubber products, and also as used in the manufacture of inks.

Carbon black is an indispensable ingredient in the manufacture of ink adapted to the needs of the modern rapid printing press. The giant multiple presses used today by our large daily newspapers which are capable of printing 200,000 pages per hour, or fifty per second, require ink of great covering power, and which will flow freely from the fountain and cover every hair line of the type or half-tone cut and make an instantaneous jet black impression. This character of ink cannot be manufactured from any product other than carbon black and in its manufacture carbon black is mixed with oil in the approximate proportion of

one pound of black to eight pounds of oil. A single pound of carbon black thus mixed with oil will print 20,000 pages of average newspaper size, of the equivalent of nearly an acre of surface. The national association of printers' ink manufacturers, which comprise 90 per cent of the manufacturers of printing ink of the United States, sometime ago gave out the following statement:

"It would be impossible to continue the supply of ink requisite for printing the newspapers of the United States if the ink manufacturers were to be deprived of the black [fol. 320] made from natural gas."

Carbon black is also an indispensable ingredient in the manufacture of automobile tires and other rubber products. In this respect, it has clearly supplanted the use of zinc oxide. A simple rubber-sulphur mixture has a tensile strength of 1,150 pounds. By adding an equal weight of zinc oxide, the tensile strength may be increased to 3,400 pounds. But, substituting for the zinc oxide 35 per cent of carbon black, the tensile strength goes up 4,000 pounds, and at the same time the ability of the rubber to store energy, that is, to take up shocks, becomes almost double that of the zinc oxide mixture. The carbon black rubber compound is stronger and more resilient, wears longer, and is less susceptible to cuts, punctures or abrasions, and is much lighter in weight than the tire made from zinc oxide. The present automobile tire, in the manufacture of which carbon black is used, will give from three to four times greater mileage than the automobile tire in which zinc oxide is used. In the present state of our knowledge of the chemistry of rubber compounds, there is no other ingredient that can take the place of carbon black in the manufacture of automobile tires. I quote from Dr. W. C. Greer, Vice-President of the B. F. Goodrich Rubber Company, in his book, "Reign of Rubber",

"The black tread has been evolved after a painstaking, intricate study, and the chemists have worked long and diligently in their laboratories to produce such a highly re- [fol. 321] silient rubber mixture. When tested on machines built for the purpose against the abrasive action of carborundum, these treads outwear dry leather by about two and one-half times; with both materials wet, they outwear leather more than ten times. An interesting test was run

some years ago to compare sheet iron and several rubber compositions. This black rubber mixture resisted the action of a powerful sand blast three times as long as the iron. The black rubber tread composition, therefore, on a pneumatic tire is the material most resistant to road abrasion that the chemist in his laboratory has been able to produce."

The process that is practically universally employed in the manufacture of carbon black, and particularly in the Panhandle field of Texas, is what is known as the channel process. It is the best and most efficient process known to the carbon black industry for the purpose of obtaining the most carbon black from the least amount of natural gas. Through the channel process approximately one and one half pounds of carbon black is manufactured from one thousand cubic feet of gas. Many and varied experiments have been made with other processes, which have been found to be impractical, inefficient and incapable of pro- [65] 399] ducing carbon black from natural gas which will meet the specifications and requirements of the users of carbon black, and particularly ink and rubber tire manufacturers, who compose more than 90 per cent of the entire carbon black market. Some other processes are now being used for the purpose of obtaining carbon from natural gas, one of which is a thermotomic plant near Monroe, Louisiana, and another is employed by the Atlas Carbon Company located near Pampa, Texas; but neither of these plants manufacture carbon black; the product manufactured is a gray substance and is in nowise in competition to carbon black, and cannot be used in the manufacture of rubber automobile tires or printers' ink, required for operating the modern rotary printing press, for the reason that the particles of carbon contained in the product manufactured from these two plants are very coarse when compared to the particles or atoms contained in carbon black, and therefore such product could give no tensile strength to rubber or permit a free flowing and jet black ink required by the modern rotary printing press.

I am acquainted with the chemical constituents of the gas produced in the Panhandle field of Texas, in both the sour and sweet areas. From a carbon black manufacturing standpoint, there is no practical difference between sweet and sour gas. Their chemical constituents are the same.

insofar as the heat units contained therein and the recovery of carbon therefrom are concerned. Considering the matter from a purely economical standpoint, sweet gas can [fol. 323] be more economically used in the manufacture of carbon black than sour gas, for the reason that hydrogen sulphide has a deteriorating effect on the carbon black plant.

Carbon black is obtained from the combination of hydrocarbons contained in natural gas by applying heat for the purpose of breaking down the gas in its component parts and separating the carbon from its chemically combined hydrogen. Thus, in the manufacture of carbon black there is neither waste of gas nor heat units contained therein, but actually, all of the heat units contained in the gas are utilized and applied to break down and separate the carbon black from the other chemical constituents in such gas.

The average natural gas is mainly methane, which, at atmospheric pressure and 32 degrees Fahrenheit, theoretically contains approximately thirty pounds of carbon per thousand cubic feet, which carbon, under a certain degree of heat application, will produce an average maximum of approximately one and one-half pounds of carbon black. It is entirely erroneous for one to say that because a thousand cubic feet of gas at the heat and pressure above mentioned theoretically contains approximately thirty pounds of carbon, that the carbon black manufacturing industry is inefficient when the average recovery of carbon black is approximately one and one-half pounds per thousand cubic feet. The total element carbon contained in gas, and the pigment called carbon black, are two entirely different [fol. 324] and separate products. If it were possible to extract the total element carbon contained in gas, such product would not be carbon black and would have no commercial value whatever. The element carbon is a veritable Proteus, occurring in such diverse forms as the diamond, coal, asphalt, graphite, charcoal, pitch, oil, gas, and even exhaled air. In natural gas, it is combined with hydrogen to form methane, and in the manufacture of carbon black it is not the problem to obtain a maximum yield of element carbon, but the objective is to obtain a particular colloidal pigment composed of particles so fine as to be beyond the resolving power of the highest powered micro-

crepe and possessing definite and unique qualities heretofore required in the manufacture of inks, paints and rubber compounds. Practically all carbon black today is manufactured according to specifications and requirements of the users of such product, and the industry knows of no more efficient method than the channel process to obtain the maximum amount of carbon black from the least amount of gas to meet the specifications and requirements of the users of such product.

There is no waste of gas or of carbon black into the air during the manufacture of such product. The chemical composition of the smoke or burned gases given off into the air during such manufacture, where the channel process is used, is as follows: first, largely water vapors; second, carbon dioxide; third, a small trace of carbon monoxide; fourth, a very small amount of carbon black, which cannot be commercially recovered, and if recovered, regardless of [illegible] cost, would have no commercial utility because the same contains approximately 30% of volatile matter absorbed on the surface of the carbon black particles, and the only way to force such carbon black from its volatile matter is by heating to extremely high temperatures in the absence of air, and such heating process would make the carbon black particles gritty and hard and render such carbon black unfit to be used in the manufacture of products in which carbon black is utilized.

[illegible] W. A. Kyarr testified as follows:

That I am forty four years of age and for the last twenty two years I have been and am now engaged in the business of manufacturing carbon black from natural gas. The manufacturing process of impinging a natural gas flame against a collecting surface in a controlled pressure, oxygen and temperature condition, whereby the hydrocarbons are separated by combustion and the hydrogen, on uniting with oxygen, is consumed in the flame and leaving the carbon deposit. The quantity and quality of the carbon black [illegible] as we vary the degrees of the temperature of the flame.

There is no difference between sour and sweet gas, for the production of carbon black, the heat units in sour or

wood gas being the same, providing the physical properties of the gas are the same.

Carbon black is made only from natural gas. To my knowledge there is no other raw material in existence that can equal natural gas in the manufacture of carbon black. Carbon black has become a commercial necessity and almost all industry are dependent upon carbon black in some way. In the automobile industry, it has added strength, heat resistance and wear to tires and other rubber products, elasticity and flexibility for ease and comfort in driving. Also permanency and beauty in the chassis, body and ornament finishes. Also in rubber foot wear, boots, shoes, heels, etc., also mechanical rubber goods, belting, etc. [fol. 327] carbon black finds its place and is in demand. Carbon black has produced the ink that has made it possible for the high speed presses, also magazine and book ink and high quality lithographing and in the printing of money. Even the publications condemning the use of natural gas for carbon black are printed with inks made with carbon black. Also protective coatings on wood and metal, such as undercoat and numerous other uses, a few of which are carbon paper, typewriter ribbons, coloring for wood, crayons, shoe polish, shoe polish, artificial leather, insulating material, coloring for cement, tile, artificial stone and absorbing agents for liquid explosives. The Department of Commerce, Bureau of Standards, in support for the statement, "It is hard to see how any black pigment can be made that can equal the various forms of carbon black in cheapness, permanence and other valuable properties."

Many millions of dollars are now invested in carbon black plants using natural gas for the production of carbon black solely and only, and the most practical and efficient methods are practiced and used in the manufacture of carbon black. Carbon black is permanent and the equipment that will destroy it, known today, is fire. Carbon black plants are always built where there is an adequate raw supply without a market, and if the gas contains a sufficient amount of gasoline, the gasoline is extracted before the residue is sent on to the carbon factory for conversion into the useful product of carbon black.

[fol. 328] Waste is "avoidable loss or destruction." Waste occurs when property is destroyed unnecessarily or due to

useful purpose. When it is declared that gas is wasted in making carbon black, then the product carbon black and by-products in which carbon black is essential specifically enumerated hereinbefore must be considered useless. There are other blacks made from burning oils, bones, etc., but they are not competative with carbon blacks in cheapness, desirability, permanence etc., and might we not consider this also a waste then.

There is no waste of heat units in the manufacture of carbon black for they are essential to its manufacture, just the same as using gas to convert water into steam to run steam turbines or engines to pump water, drill wells or produce electricity, boil a meal or convert the gas into heat for the home or cooking purposes.

[fol. 329] HERBERT DICKARD testified as follows:

That he is forty years of age, and for the last fifteen years has been actively engaged in the profession of Mechanical Engineer, specializing in hydro carbons and in the production, transmission and utilization of natural gas, and has designed all manner of equipment in the above work, including plants for the manufacture of carbon black from natural gas and extraction of gasoline from natural gas.

In the utilization of natural gas, there can be no distinction drawn from an economic standpoint between the use of gas containing hydrogen sulphide and gas which does not contain hydrogen sulphide. The methane, ethane and propane molecules which are the chief constituents of all natural gases in varying proportions are identical whether associated with sulphur compounds or any other chemical compounds that may be mechanically suspended in the gases. One of the fundamental laws of the gaseous portion of the methane series of hydro carbon compounds is the fact that they will not combine with any other compound or substance under ordinary temperatures and pressures such as are encountered in the production and distribution of natural gas. From one economical standpoint to prohibit the use of hydro carbon gases from their manufacture into an essential product is on the same basis of prohibiting a human being from following some line of endeavor due to the color of his hair.

The present day method of manufacturing carbon black [fol. 330] from natural gas, and natural gas is the only substance from which it can be manufactured in a usable form, is by what is known as the Channel process. This process essentially consists of decomposing the gas at suitable temperature without converting all of the carbon into other gases through the combination of oxygen. The present Channel process is the most economical way for the recovery of this valuable commodity and this process as is used today is the result of continuous research on the part of the manufacturers and others to obtain from natural gas the maximum amount of usable amorphous carbon. There is no waste in the manufacture of carbon black. In all manufacturing processes wherein there is involved the breakdown in the formation of molecules to create some certain substance, that is desired from those molecules, requires energy. Energy is heat, and power is another form of energy. In the manufacture of carbon black all of the heat units contained in the gas are actually utilized and applied to break down the chemical constituents of the gas and produce the pigment called carbon black.

In natural gas, where the carbon content is approximately thirty pounds per thousand cubic feet, the recovery of carbon black is from one and one-half to two pounds per thousand cubic feet. To the average person who does not have knowledge of the innumerable physical forms of carbon and heat reactions, this would appear, offhand, to be a low [fol. 331] recovery, but actually, it is a very high and efficient recovery. Because one thousand feet of gas may contain, theoretically, thirty pounds of total carbon does not mean at all that it contains thirty pounds of carbon black. The total element carbon contained in gas, and the pigment or product called carbon black, are entirely two different and separate products. The pigment called carbon black can only be obtained from the element carbon, or the total hydro carbons contained in natural gas, by the application of heat, in order to break down and separate the pigment called carbon black from the hydro carbons contained in the gas. If it were possible to extract the total volume of carbon contained in gas, such product would not be carbon black and would have no commercial value whatever. As a matter of fact, the present Channel process universally used in the manufacture of carbon black recovers all of the

pigment or product known as carbon black contained in gas that will meet the specifications and requirements that the users and consumers of such product demand. At least, the best engineering brains for the past quarter of a century have not been able to devise any process to materially increase the yield of carbon black over the Channel process. It is true that experiments have been made with other processes, and there will be found a few small plants using other processes instead of the Channel process, in some of which the recovery of the carbon from the gas will range from eight to twelve pounds, but the product manufactured is not carbon black, and it cannot be used in commodities in which carbon black is used as an ingredient, and partic- [fol. 332] ularly cannot be used in the manufacture of the automobile tire and printers' ink, and the market for such character of carbon is very limited. The production from this type of process is comparatively small and cannot be classed as a part of the carbon black industry.

It can be shown that in the manufacture of graphite through the electrical decomposition process, if natural gas is used as a fuel to generate the electrical power based upon the original B. T. U. units, the heat loss based upon the final recovery at the point of the carbon electrodes, a merchantable product is left and three per cent of the total units so consumed. This does not take into consideration the line losses from wells to distributing systems, and in the distributing systems which have been shown repeatedly through survey of the Bureau of Mines and individual engineers, to be 33⅓ per cent of all the gas produced. The well-known losses of the available gas is such that no engineer would plan any project for the utilization of the natural gas unless there was included therein a charge to cover these losses. A recent survey of five cities in the State of Kansas showed that the losses in the distribution system were actually thirty times as great as the arbitrary figure used by the engineering profession, and in actual practice these figures indicate about the average losses encountered.

In actual tests made by my laboratory, based on gas of one thousand B. T. U. on kitchen stoves picked at random, were as follows: in raising the temperature of eight pounds [fol. 333] of water from 70 degrees to 212 degrees should require one thousand one hundred thirty-six (1,136) B. T. U. In these tests, the actual requirement showed efficiency of

only 6 per cent. In the use of natural gas under the ordinary commercial boiler requires one hundred thirty thousand (130,000) B. T. U.'s on the average for each actual horsepower of work at the machines. This is approximately an efficiency of 2 per cent. The thermal loss of heat units through radiation, conversion, and infiltration of cold air into the rooms of the average frame residence will average an efficiency of not more than 4 per cent of the total units available in natural gas at the wells. In smeltering brass, and other non-ferric metals, in the average foundry, shows an absorption efficiency of less than three per cent of the total available heat units in natural gas.

In the manufacture of carbon black from natural gas, based upon the total available substances that may be obtained per pound is far more efficient than the utilization of either wood or coal for heating purposes. When wood is burned for fuel, there is consumed over one hundred valuable chemical compounds which are lost in the burned gases. When wood is manufactured into lumber, only approximately 5 per cent of the value of the tree is converted into usable articles. Even the mining and common usages of salt in not utilizing the same for the manufacture of the many valuable sodium compounds contained therein is far less than the efficiency of the present Channel type carbon black. Carbon black manufactured from natural gas is a product that is absolutely essential for the welfare of the people and the chemical changes in which natural gas undergoes in the formation of this valuable commodity can in no sense be called a waste.

[fol. 334] CLARK C. BOARDMAN testified as follows:

That he is a resident of Monroe, Louisiana; that he is 48 years of age, and a mechanical engineer by profession, having completed a course in Mechanical Engineering at the University of Wisconsin in 1910; that he was employed in public utility business from 1910 to 1923, during which time he was in charge of engineering work in connection with the production and distribution of electrical power, steam heat and artificial gas, and that during such employment he supervised the construction and operation of gas plants producing gas by retort, coke oven, and water gas processes, and engaged in extensive experimental research work in connection with the use of gas and the use

of bituminous coal as a generator fuel in water gas production. Since 1923, he has been in charge and operation of plants for the production of gas carbon by thermal decomposition process, and that he has several patents covering phases of this process; that he is thoroughly familiar with the carbon black industry, the chemical constituents of gas from which carbon black is manufactured, the type and construction of factories, and the processes used for the manufacture of carbon black.

The big majority of carbon black today is manufactured by what is termed the channel process. This process or type of plant is used almost exclusively in the Panhandle [fol. 335] gas field of Texas. It is the most efficient process known to the carbon black industry for recovering the greatest quantity of that character of carbon black from the least amount of natural gas that will meet the specifications and requirements of the tire and rubber manufacturers and ink manufacturers, who afford more than 90 per cent of the total market of all carbon black manufactured today. The average yield of carbon black from a thousand cubic feet of natural gas, where the channel process is used, is from one and one-half to two pounds. The average natural gas is mainly methane (CH_4), which at atmospheric pressure and 32° Fahrenheit, theoretically contains approximately thirty pounds of carbon per thousand cubic feet, but this does not mean that one thousand cubic feet of gas at such pressure and heat contains or would yield thirty pounds of carbon black. In the first place, there is a wide distinction between the element carbon and the pigment called carbon black. A thousand cubic feet of gas contains approximately thirty pounds of the element carbon, but not of the pigment called carbon black. The element carbon is a veritable Proteus, occurring in such diverse forms as the diamond, coal, asphalt, graphite, charcoal, pitch, oil, gas, and even exhaled air. In natural gas, it is combined with hydrogen to form methane. When a certain degree of heat is applied to the element carbon contained in natural gas, which is a combination of hydro carbons, such combination of hydro carbons produces the pigment or product called carbon black, and the greater amount or degree of heat that is applied, the better is the grade or [fol. 336] quality of carbon black obtained. In the manufacture of carbon black it is not the problem to obtain a maximum yield of carbon, or even of black carbon. If this

were all that were sought to be accomplished, it could be more easily and economically done by powdering coal, coke, charcoal, or graphite, but in the manufacture of carbon black from natural gas, the real and true objective is to obtain a particular colloidal pigment composed of particles so fine as to be beyond the resolving power of the highest powered microscope and possessing certain definite and unique qualities when employed in inks, paints and rubber compounds.

Therefore, from what I have said above, it is entirely erroneous for one to say that because one thousand cubic feet of natural gas at the pressure and heat conditions above mentioned, theoretically contains approximately thirty pounds of carbon, that the carbon black manufacturing industry is inefficient when the recovery of the product or pigment called carbon black is from one and one-half to two pounds per thousand cubic feet. That, in truth and in fact, all of the carbon black that is contained in natural gas, which will meet the specifications and requirements of users of such carbon black, is obtained from such gas through the channel process. At least, no one thus far has discovered a means of materially increasing the yield of carbon black without losing some of the qualities peculiar to carbon black alone, and to which it owes a large part of its universal utility.

The ordinary criticism of the carbon black industry is [fol. 337] usually based upon the erroneous assumption that in the manufacture of carbon black the B.T.U. or heat units contained in the gas are wasted. In the manufacture of carbon black there is no waste of gas nor of the heat units contained in such gas, for the reason that heat is required to take the carbon black from its chemically combined hydrogen. Thus, in order to manufacture carbon black from natural gas it is necessary to utilize and apply all of the heat units contained in such gas for the purpose of generating heat to break down and separate the carbon black from the other chemical constituents of such gas, and the more heat applied or heat units ultilized, the finer and better quality of carbon black that will be obtained. When carbon black has been packed at the plant it is a finished article, ready to be used by the next processor, for instance, the production of automobile tires; in much the same way that stainless steel, tool steel or axle steel is a finished product

at the steel mill and ready to be used by the next processors in the construction of industrial plants, machine tools and automobiles. Such high grade steels are the result of numerous processes requiring a large amount of heat, begining with the smelting of iron ore, followed by heat treatments, alloying and finishing. These heating processes require the use of a very large quantity of fuel in the form of coal, coke, oil, or natural gas. Similarly, the production of electric power requires heat in very large quantities. The heat represented by one kilowat- hour of electricity is a very [fol. 338] small fraction of the heat actually used for its generation, most of which is dissipated in the production of combustion going up in the smoke stack and in the hot water that leaves the condensing equipment. It would be as reasonable to criticize and hamper the production of high grade steel and electric power as to criticise the use of the B.T.U. or heat units contained in natural gas, for the production of carbon black.

The carbon black industry is old, when compared to the recent high quality steel industry or the production of electric power. The personnel of the industry has spent lavishly on research and has improved the process as a result of this research. Obviously, the producers or users of the product would have developed a production method requiring less gas if they knew how to do it.

There is no waste of gas or carbon black into the air during the manufacture of such product. In 1927 an actual chemical analysis test was made under my direction of the fumes in the top of the burner houses of the Imperial Oil & Gas Production Company's carbon black plant located at Sterlington, Louisiana, which plant is a channel process plant and similar to all other channel process plants, and such analysis of a dry sample of such fumes, all water vapors therein having been eliminated, showed the following:

Carbon Dioxide	1.9%
Oxygen	16.2%
Hydrogen	1.7%
[fol. 339] Carbon Monoxide	.0%
Hydro-carbons	.3%
Nitrogen	79.9%
	100. %

In 1934 a similar analysis test was made under my direction of the fumes in the top of the burner house of the Keystone Carbon Company plant located at Sterlington, Louisiana, which is likewise a channel process plant and such analysis showed the following:

Carbon Dioxide	2.9%
Oxygen	14.9%
Hydrogen	.6%
Carbon Monoxide	.0%
Hydro-carbons	.0%
Nitrogen	81.6%
	100. %

The approximate analysis of air is:

Oxygen	20%
Nitrogen	80%
	100%

Comparison of the above analysis will show practically complete combustion of the gas used in the manufacture of carbon black.

[fol. 340] The fumes or vapors and burned gases going into the air, during the manufacture of carbon black, contain only approximately 2/100 of a pound of carbon black per one thousand cubic feet of gas utilized, or approximately 1.3% of the total pigment carbon black contained in such volume of gas, which gives a dark appearance to such escaping fumes and vapors; that such amount of carbon black cannot be economically recovered, but if recovered would have no commercial utility or value whatever, because of the volatile matter contained therein.

[fol. 341] S. O. Reeder, testified as follows:

That he has been in the carbon black business for thirty-one years, and for the past twenty-one years he has been superintendent of carbon black manufacturing plants; that since May 1, 1935, he has been superintendent of the carbon black plant of the Combined Carbon Company located

at Sanford, Texas, which was the date that said plant commenced operations.

That said plant of the Combined Carbon Company, at present, has a capacity for approximately thirty million cubic feet of gas per day. That such plant will require, in the future, until such time as the same may be enlarged, approximately thirty million cubic feet of gas per day. That all the gas that the Combined Carbon Company is receiving in its said plant comes from the plant of the Henderson Company at Sanford, Texas, and the Combined Carbon Company does not receive any gas from any other source.

That the plant of the Combined Carbon Company, as now constructed, consists of 4 units with provisions made and allowed for an enlargement of said plant to approximately fifty million cubic feet per day; that said plant has been operating since on or about May 1, 1935; that it has [fol. 342] been constructed of the latest, up-to-date and approved machinery known to the carbon black industry, and that such machinery, methods and process used for the manufacture of carbon black are employed by the Combined Carbon Company in its said plant, to the end that the greatest amount of carbon black can be recovered from the least amount of gas processed in such plant; that there is no physical waste of gas in the manufacture of carbon black in the plant of the Combined Carbon Company and that such plant is manufacturing approximately one and one-half pounds of carbon black from every one thousand cubic feet of gas processed in such plant.

[fol. 343] S. O. Reeder, further testified as follows:

That said plant of Combined Carbon Company is what is known as the channel type plant and has a present capacity of approximately 30,000,000 cubic feet of gas per day. That said plant, since operations for the manufacture of carbon black were begun on May 1, 1935, has actually utilized the following amounts of natural residue gas in the manufacture of carbon black:

Month	Daily Average Cubic Feet
May, 1935	1,116,000
June, 1935	15,532,000
July, 1935	24,793,000

Month	Daily Average Cubic Feet
August, 1935	27,978,000
September, 1935	29,275,000
October, 1935	29,485,000
November, 1935	29,278,000
December, 1935	29,365,000
January, 1936	29,223,000
February, 1936, (to date)	29,310,000

That such plant will require in the future, until such time as the same may be enlarged, approximately 30,000,000 cubic feet of gas per day.

That all of the gas that Combined Carbon Company is receiving in its said plant comes from the gasoline plant of [fol. 344] The Henderson Company at Sanford, Texas, and the Combined Carbon Company does not receive any gas from any other source.

That the plant of Combined Carbon Company, as now constructed, consists of four units, with provisions made and allowed for enlargement of said plant to a capacity of approximately 50,000,000 cubic feet of gas per day. That said plant is constructed of the latest and most up-to-date and approved machinery known to the carbon black industry and that such machinery, methods and process used for the manufacture of carbon black are employed by said Combined Carbon Company to the end that the greatest amount of carbon black can be recovered from the least amount of carbon black processed in said plant. There is no physical waste of gas in the manufacture of carbon black in the plant of Combined Carbon Company; the gas is first passed through the absorbers of The Henderson gasoline plant, where the gasoline content in such gas is recovered; the pressure at which the gas enters the Combined Carbon plant is controlled by regulators and kept at the lowest possible point in order to promote economy, and the air supply is carefully regulated and the gas is fully utilized. Such plant of Combined Carbon Company is manufacturing approximately one and one-half pounds of carbon black from every one thousand cubic feet of gas processed in such plant.

[fol. 345] C. A. SEIPLE testified as follows:

That he is employed by The Henderson Company in the capacity of plant superintendent of the gasoline manufacturing plant of such company, located at Sanford, Texas; that he has been in the employ of The Henderson Company at said plant for a continuous period of six years, and has had charge of the operation of said plant as superintendent for the last two and one-half years.

That affiant is familiar with the operating conditions of said plant and the cost of operating the same in the manufacture of natural gasoline. That said gasoline plant cannot be profitably operated on 13,000,000 cubic feet of gas per day, and that, irrespective of the question of profitable operation on such a volume of gas, it would be impossible to operate said plant on such a small volume of gas during the winter months, where freezing temperature obtains, for the reason that such volume would be insufficient to prevent freezing conditions occurring in different parts of the machinery and equipment constituting said plant, and if the plant were limited to 13,000,000 cubic feet of gas per day, for the reasons above stated, the same would have to be shut down.

Affiant further states that he is familiar with the gas [fol. 346] producing wells in the vicinity of said plant and in the Sanford area, and that there are no unconnected sour gas wells in said area and the vicinity of said plant to which The Henderson Company could make connection and purchase gas therefrom, with the exception of three wells which are owned, as affiant is informed, by the Texoma Natural Gas Company, with which The Henderson Company, for a long period of time, has attempted to make connection but has been unsuccessful. That the only remaining sour gas area in the West Panhandle field is located miles distant from the plant of The Henderson Company and is undeveloped.

[fol. 347] MORRIS E. DRY testified as follows:

I am the President of Combined Carbon Company, a Delaware corporation, qualified to do business in the State of Texas.

On or about October 9, 1934, Combined Carbon Company entered into a contract with The Henderson Company, the complainant in the above entitled action, under which The Henderson Company agreed to produce and supply to Combined Carbon Company the latter's requirements of the stripped or residue gas produced by The Henderson Company at its gasoline refining plant at or near Sanford, Hutchinson County, Texas. The parties are operating under this contract and I am informed and believe that Combined Carbon Company is at present utilizing approximately twenty-six million (26,000,000) cubic feet of gas per day in its said plant, which gas is residue gas of the said plant of The Henderson Company purchased by Combined Carbon Company from The Henderson Company pursuant to the above mentioned contract.

In reliance upon the above mentioned contract, Combined Carbon Company caused to be constructed for it near the said plant of The Henderson Company a carbon black plant at the cost of approximately Seven Hundred Sixty-two Thousand Dollars ($762,000), which sum Combined Carbon Company is obligated to pay from its revenues and the operation of its said plant and the sale of its product constitute the only source of its revenue.

[fol. 348] On or about November 19, 1934, Combined Carbon Company entered into a contract with United States Rubber Products, Inc. under which the latter company agreed to purchased from the former all of the carbon black produced by Combined Carbon Company, which contract is to continue for a number of years.

The residue gas which The Henderson Company is obligated to deliver to Combined Carbon Company as above mentioned is the only source of gas supply that Combined Carbon Company now has under contract to furnish its requirements.

I am informed and believe that the classification of fourteen (14) wells of The Henderson Company as sweet wells and the denial of the use of gas therefrom for the manufacture of carbon black greatly impairs Combined Carbon Company's contract with The Henderson Company and will impair the ability of Combined Carbon Company to pay off its outstanding indebtedness from revenues from its product and to perform its contract with United States Rubber Products, Inc.

I am informed and believe that in the event the provisions of the Act of the Legislature of the State of Texas restricting the use of sweet gas are enforced with the consequent denial to Combined Carbon Company of the right to use sweet gas as defined by said Act from the wells under contract with The Henderson Company, as residue gas of The Henderson Company's plant, it will be necessary for Combined Carbon Company to look elsewhere for further gas to meet its requirements unless The Hender-[fol. 349] son Company rehabilitates its reserves to the extent that they are depleted by such classification as sweet gas.

I am informed and believe that the plant of Combined Carbon Company is constructed with the latest known and improved appliances and machinery; that said company employs the latest improved methods and designs so that the greatest amount of carbon black can be obtained from the least amount of gas processed in such plant; that in the manufacture of carbon black in the plant of Combined Carbon Company there is no physical waste of such gas and that the company is manufacturing more than one pound of carbon black per thousand cubic feet as required in the above mentioned Act of the Legislature of the State of Texas.

[fol. 350] Fred E. DeVore testified as follows:

That he is 49 years of age and resides in Amarillo, Potter County, Texas; that he is now, and for the past thirty years has been, engaged in the oil and gas business, which has included the drilling of oil and gas wells and the ownership and production of oil and gas properties; that he is vice-president and general manager of the Paramount Oil Corporation, which company, several years ago, acquired the oil and gas leasehold estate covering: The West Half (W ½) of the North 275 acres of Section 82, Block 46, H&TC Ry. Co. Survey, known as the Paramount Oil Corporation lease, near the town of Sanford, Texas. That the Paramount Oil Corporation drilled three wells on the above described property, in 1927-1928, two of which wells produced for some time considerable quantities of oil, but are not now producing any oil; that all of said wells were producers of gas in large quantities. That affiant drilled

eight wells in the Sanford area, and has, in the past, had charge of the operation of various leases in the Sanford area and is well acquainted with the producing gas wells in said area.

That there has never been any market for gas produced in the Sanford area, for light and fuel purposes, and there is not now any market for gas for such purposes in said area; that affiant was never able to obtain any market for the gas capable of being produced from the Paramount [fol. 351] lease until a casinghead gasoline plant was constructed some years ago by the Phillips Petroleum Company at Sanford, Texas. Sometime after the construction of such plant affiant was able to make connection of the wells on the Paramount lease to the Phillips Petroleum Company, and such company thereafter received a portion of the gas capable of being produced from said lease, for the purpose of processing the same in its casinghead gasoline plant.

In 1933, the wells on the Paramount lease were disconnected from the plant of the Phillips Petroleum Company and connected with the plant of The Henderson Company, and since such time it has been taking gas from said property.

Affiant further states that for years he has endeavored to obtain some outlet for the gas capable of being produced from the wells on said lease, for light and fuel purposes, and has interviewed the various pipe line companies who have lines and transportation facilities in the vicinity of the Sanford area, in an effort to obtain a market for the gas, or a portion thereof, produced from such properties, for light and fuel purposes, but such pipe line companies have refused to purchase any gas from the Paramount lease and other owners in the Sanford area, as well as in the field generally, whether sweet or sour, for the reason that they have more than sufficient gas of their own to supply their own market requirements, and that the only [fol. 352] market or outlet that has been afforded in the past, and the only market or outlet that is afforded now, or can be hoped for in the future, for the gas from the Paramount lease and the leases of other owners in the Sanford area, has been in the past, and is now, to the casing-

head gasoline plants of the Phillips Petroleum Company and The Henderson Company.

Affiant further states that there is no market or outlet for gas in the Panhandle field for the purpose of reintroducing such gas into the oil or gas bearing horizon for maintaining or increasing the rock pressure; that there is no market for gas in the Panhandle field to be used for gas lift in the bona fide production of oil, and that there is no market or outlet for gas in the Panhandle field for use in the manufacture of chemicals; that the only outlet for gas in said field is for use in casinghead gasoline extraction plants, with the residue going to carbon black manufacture, and for light and fuel purposes; that the light and fuel market is absolutely controlled by the gas pipe line companies, above referred to.

[fol. 353] R. E. Underwood testified as follows:

That he is a resident of Amarillo, Potter County, Texas, engaged in the practice of law at such place; that he is the record owner of the oil and gas leasehold estate covering: All of the North 80 acres of the J. T. Williams Survey No. 1, located by virtue of Certificate No. 1233, State Abstract No. 506, patented to Gunter & Munson, March 26, 1909 by Patent No. 540, Volume 38, in Hutchinson County, Texas, which is located near the town of Sanford, Hutchinson County, Texas; that affiant owns a substantial interest in said oil and gas leasehold estate and holds said lease in trust for himself and others, who are owners of undivided interests therein.

That upon said lease there was drilled and completed, about in the year 1927, one well, which is capable of producing gas only; that for years, affiant and his associates have endeavored to obtain a market or outlet for the gas capable of being produced from such well, for light and fuel purposes, but have been unable to do so. That the only market or outlet that has ever been available to affiant for the gas capable of being produced from said well is to The Henderson Company, with whom affiant has a contract for the sale of gas from said well for processing the same in the casinghead gasoline plant of The Henderson Company at Sanford, Texas, and furnishing the residue thereof

for carbon black manufacture, with the exception that affiant possibly could sell the gas capable of being produced from said well to the Phillips Petroleum Company, who likewise operates a casinghead gasoline plant at Sanford, Texas, of similar character to that of The Henderson Company.

[fol. 354] **Complainant's Documentary Evidence**

1. Corporation Permit

Department of State

W. W. Heath, Secretary of State

Permit to do Business. Expires 10 Years from Date.

(Seal)

No. 8278

The State of Texas,
Department of State:

This is to certify that The Henderson Company incorporated under the laws of Maine, has this day complied with the laws governing the admission of foreign corporations to transact business in Texas, and is hereby granted a permit to transact the following business for a period of ten years from this date: The Manufacture of Gasoline, together with such further rights and privileges as are conferred on foreign corporations by the laws of Texas, subject to compliance with the Constitution and laws thereof.

In Testimony Whereof, witness my official signature and the Seal of the State of Texas, affixed at Austin, this 13 day of October 1934.

(Signed) W. W. Heath, Secretary of State. (Seal.)

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2. Contract for Sale of Residue Gas

[fol. 355] Agreement dated October 9th, 1934, by and between The Henderson Company, a corporation organized and existing under the laws of the State of Maine, with an office at 602 Olive-Eakle Building, Amarillo, Texas, and

Combined Carbon Company, a corporation organized and existing under the laws of the State of Delaware,

Witnesseth: That,

In Consideration of the mutual covenants and agreements hereinafter undertaken, it is hereby mutually agreed as follows:

1. Immediately upon the execution hereof, Combined Carbon Company will commence and within six (6) months after the completion of a sidetrack to serve the location hereafter referred to it will complete the erection and equipment, on a suitable location, (if available to an extent of at least eighty acres under a lease for at least twenty years at a reasonable rental), near the gasoline refining plant of The Henderson Company at or near Sanford, Hutchinson County, Texas, of a manufacturing plant adequate to make not less than 6,000,000 pounds of carbon black per year, and within nine (9) months after the completion of said sidetrack it will complete the erection and equipment of an additional plant adequate to make not less than 4,000,000 pounds of carbon black per year, said plants to utilize gas now being discharged by The Henderson Company as a residue from the manufacture of natural gasoline. Combined Carbon Company will complete said sidetrack within one (1) month after the date hereof.

2. The Henderson Company will sell to Combined Car- [fol. 356] bon Company all of the stripped (or residue) gas now being produced or which may hereafter be produced at said gasoline plant of The Henderson Company as Combined Carbon Company may be able to make use of or to dispose of by sale to other parties, for such period of time as The Henderson Company, its successors or assigns, shall use and produce such gas at its said plant or any extension or additions thereto. The Henderson Company will produce and supply to Combined Carbon Company its requirements of such residue gas and Combined Carbon Company will purchase from The Henderson Company all of the stripped or residue gas required by Combined Carbon Company for its own use and for sale to other parties so far as the quantity of gas produced by The Henderson Company shall be sufficient to meet such requirements. If at the end of six (6) months from date of completion of the entire plant the purchases of gas hereunder by Combined Carbon Company shall not equal the production of

The Henderson Company and The Henderson Company is able to supply greater quantities of gas and if Combined Carbon Company is not excused from taking such amounts under any other provision hereof The Henderson Company shall have the right upon thirty (30) days prior written notice to Combined Carbon Company to sell the gas not purchased by Combined Carbon Company to other persons as agent of and for the account of Combined Carbon Company at not less than three-quarters of a cent (¾¢) per unit of one thousand (1,000) cubic feet, measured as hereinafter provided, plus all taxes applicable to such sales [fol. 357] provided that The Henderson Company shall not offer gas for sale to other persons prior to the expiration of such thirty (30) days at prices lower than those quoted by Combined Carbon Company and provided that not in excess of 25,000,000 cubic feet of gas per day shall be so sold to other persons prior to the expiration of nine (9) months from date of completion of said entire plant and not over 50,000,000 cubic feet of gas per day shall be so sold to other persons prior to the expiration of twelve (12) months after the date of completion of said plant.

Combined Carbon Company shall not be bound to purchase gas hereunder if the composition or nature of such gas shall change so that it cannot be profitably used in the manufacture of carbon black, or if for any other reason the manufacture of carbon black shall become unprofitable at such location.

3. The Henderson Company will deliver such gas as may be required by Combined Carbon Company as above provided in as nearly uniform daily and hourly deliveries as may be practical and possible. Delivery of such gas or such portions thereof as may be required by Combined Carbon Company from time to time shall commence from such time or times as Combined Carbon Company is ready to receive the same not to exceed six months from date hereof.

4. The price to be paid by Combined Carbon Company to The Henderson Company for gas delivered under this agreement including gas sold to others for account of Combined Carbon Company shall be one-half cent (½¢) per [fol. 358] unit of one thousand cubic feet. There will be no charge for gas used by Combined Carbon Company in its own operations of manufacturing carbon gas black solely

for light, heat or power purposes. The measurement of all gas referred to in this agreement shall be made on the basis of four (4) ounces to the square inch above atmospheric pressure of 14.4 pounds per square inch at sixty (60) degrees Fahrenheit temperature. Gas actually delivered at other pressures and temperatures shall be calculated into quantities as above defined by standard and recognized formulæ commonly used in the natural gas industry and in the event of disagreement by formula and method recommended and approved by the United States Bureau of Mines.

5. Such gas shall be measured by standard measuring device or devices (orifice meter unless otherwise agreed to between the parties), such meter or meters to be installed by Combined Carbon Company under the supervision of The Henderson Company or its representatives. Combined Carbon Company shall maintain and operate the measuring equipment and devices and shall keep and preserve the daily meter charts recording the quantity or quantities of gas delivered. The Henderson Company shall have the right of access to and inspection and checking of said daily meter charts which shall be kept in a convenient place at said plant of Combined Carbon Company, to inspect said meter or meters, and if it desires so to do may, at its own cost and expense, install duplicate measuring device or devices for the purpose of checking the quantity [fol. 359] of quantities of gas delivered. Either party may have the metering devices tested for accuracy at reasonable periods. If in any test of metering devices an error exceeding four per cent, (4%) shall be found in such measuring devices an adjustment shall be made of the amount of gas sold and delivered during the period since the last test not exceeding thirty (30) days. The expense of testing metering devices shall be borne by the party making same provided that if in any such test made by The Henderson Company such metering device or devices shall be found to be more than four per cent (4%) slow, the expense of any such test shall be borne by the Carbon Company. Gas consumed by Combined Carbon Company shall be metered at its plant. Combined Carbon Company will pay for any gas lost by breakage in the pipe line to its plant from the plant of The Henderson Company, such loss to be determined by estimates mutually satisfactory to the parties hereto.

7. In the event that the measuring equipment shall at any time become defective or inoperative, for any reason, and fail correctly to record the gas deliveries, the average of the daily deliveries of the preceding ten (10) days shall be taken as and assumed to be the daily delivery during the period in which such measuring equipment fails correctly to record the gas deliveries provided that such average of daily deliveries shall be adjusted for any variation in the average daily production of carbon black during such ten (10) day period and the period in which said metering equipment failed to record [fol. 360] the gas deliveries. In the event of any disagreement regarding the quantity or quantities of gas delivered during such time or times the parties will submit such disagreement to an arbitration committee to be composed of one person to be selected by The Henderson Company, one person to be selected by Combined Carbon Company and a third person to be selected by the persons theretofore selected, the said committee thereupon to determine such disagreement and decide upon the same, the findings of any two or all of the members of such committee to be final and binding upon the parties.

8. Combined Carbon Company shall on or before the 20th day of each month report to The Henderson Company the quantity of gas delivered and purchased during the preceding month and shall pay on or before the 20th day of each month for the gas delivered and purchased during the preceding month.

9. This agreement shall at all times be and remain subject to the provisions of the contracts between The Henderson Company and the various producers of natural gas supplied to its gasoline plant aforementioned, copies of such contracts being annexed hereto and made a part hereof which contracts The Henderson Company agrees to comply with and keep in full force and effect.

10. This agreement is hereby made subject to all legal rules and regulations now in force, or which may hereafter be promulgated, by the Railroad Commission of the State of Texas, or any other governing body, State or Federal, and subject also to the laws of the State of Texas now in force, or which may hereafter be passed, regulating the natural gas industry upon which this contract is based.

[fol. 361] 11. None of the parties hereto shall be liable for any default or delay caused by acts of God, or by any contingency beyond their control, or the control of the parties with whom they contract to cover this agreement, preventing or interfering with the making of delivering or receiving of the same, including war, strike, lockout, accident, fire, flood, drought, windstorm, cloudburst, lightning, and any other contingency affecting the natural gas industry and beyond the control of the parties or of the parties with whom they ocntract to cover this agreement. In case of strike, lockout, accident or other of the contingencies above referred to which are unavoidable or beyond the control of such parties, causing a stoppage or partial stoppage of the works of either of the parties hereto or the parties with whom they contract to cover this agreement, delivery and receipt of the gas hereby contracted for may be partially or wholly suspended (as the case may be), during the continuance of such interruption. Such suspension, however, shall not in any wise invalidate this agreement but on resumption of work the delivery shall be continued as herein provided, and no liability shall be incurred by either the seller or the buyers for damages resulting from such suspension.

12. The price to be paid to The Henderson Company for gas hereunder shall be subject to increase by the amount of any State or Federal taxes which may hereafter be imposed upon The Henderson Company in respect of the production or the sale of such gas.

13. Time is of the essence of this agreement and upon [fol. 362] the failure of Combined Carbon Company to comply with Section 1 hereof within the time limits therein stated this agreement shall at the option of The Henderson Company, be null and void.

14. All of the terms and conditions of this agreement shall inure to the benefit of and be binding upon the successors and assigns of the parties hereto.

15. Combined Carbon Company will lay and maintain a pipe line or lines of sufficient capacity to transport such gas from said plant of The Henderson Company to its plant and receive such gas at the discharge or working pressure of the plant of The Henderson Company, not less than twenty-five (25) pounds gas sold by or for the account

of Combined Carbon Company to other persons shall be metered at the plant of The Henderson Company.

16. The Henderson Company will supply at its plant the requirements of Combined Carbon Company for water up to 50,000 gallons per day at 2½¢ per barrel of 42 gallons as long as water shall be available at the plant of The Henderson Company. Meters shall be provided and maintained at the expense of Combined Carbon Company at the plant of The Henderson Company.

In Witness Whereof, the parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first above written.

The Henderson Company, (Signed) by F. C. Henderson, President. Combined Carbon Company, (Signed) by Morris E. Dry, President.

Attest: (Signed) F. C. Hall, Secretary.
Attest: (Signed) John Dole, Secretary.

[fol. 363]

Exhibit A

Hutchinson County Texas Gas Contracts

No.	Makers	Date	Description	Date Recorded
1	Gordon & Garnes and June F. C. Henderson	25, 1929	S.W. ¼ W. of Half of N. 80 acres of S. 320 acres Section 83, Blk. 46 H&TC Survey.	2-27-30 Vol. 54, Page 365
2	T. M. Deal and F. C. Henderson	July 2, 1929	N. ½ S. 160 acres Section 81 Blk. 46, Certificate 48/6773.	2-27-30 Vol. 54, Page 375
3	Oil Operators Tr., Continental Oil Company and F. C. Henderson	July 3, 1929	Well #2, in center of 10 acre tract in S. W. cor. of N. 46 acres of S. 366 acres Section 82, Blk. 46, H&TC Survey.	2-27-30 Vol. 54, Page 359
4	W. A. Maupin and F. C. Henderson	July 16, 1929	N. ½ & S. E. ¼ of N. W. ¼ of N. ½ of S. 320 acres Section 83, Blk. 46, H&TC Survey.	2-27-30 Vol. 54; Page 370

[fol. 364]

5	R. A. Burnett and F. C. Henderson Inc.	Jan. 17, 1931	East 36 acres of North 46 acres of South 366 acres Section 82, block 46, H&TC Survey.	8-8-33 Vol. 63 Page 311
6	Texorado Oil & Gas and F. C. Henderson Inc.	Jan. 22, 1931	N. ½ of S. 160 acres of Section 83, Blk. 46, H&TC Ry. Co. Survey, 80 acres of land.	8-8-33 Vol. 63; Page 301
7	R. E. Underwood and May F. C. Henderson Inc.	17, 1933	N. 80 acres J. T. Williams survey 1, certificate 1233.	7-14-33 Vol. 63 Page 193

Exhibit A Continued

8	Skelly Oil Co. and F. C. Henderson Inc.	June 1, 1933	N. E. ¼ of N. ½ of S. ½ Section 82, Blk. 46 H&TC Co. Survey	8 14 33 Vol. 63; Page 316
9	North American and F. C. Henderson Inc.	Aug. 31, 1933	Center of S. 320 acres of N. 450 acres Section 86 Blk. 46, HTC survey	12 5 33 Vol. 64 Page 136
10	L. M. Fischer Tr. et al. and F. C. Henderson Inc.	Sept. 13, 1933	W. ½ of N. 275 acres of section 82, Blk. 46 H&TC R. Co. survey	2 13 34 Vol. 64; Page 389

[fol. 365]

11	Bessie Rubin and F. C. Henderson Inc.	Sept. 14, 1933	Survey No. 1 SF 12952 D. Rubin Grantee; Survey 2 S F 12953, same Grantee; Survey 5 S.F. 12950, same Grantee: Survey 6 S.F. 12957, same Grantee, containing in all 57.64 acres.	10 6 33 Vol. 63, Page 558

Assignments of Oil and Gas Leases

No.	Makers	Date	Description	Date Recorded
12	J. Wood Glass and The Henderson Co.	Oct. 1, 1934	189½ acres lying along S. side sections 85, 6, 7, particular described in Deed from Joe Whittenburg.	Not recorded
13	Sam C. Watt to F. C. Henderson, Inc.	May 26, 1933	¾ of ⅞ of lease covering N. 160 acres of S. 240 acres of N. 400 acres. S. 87 Blk. 46 H&TC Ry. Co. survey.	10 5 33 Vol. 63 Page 551

[fol. 366]

14	Karl A. Crowley to F. C. Henderson, Inc.	June 16, 1933	¼ of ⅞ of lease covering N. 160 acres of S. 240 acres of N. 400 acres Section 87, Blk. 46, H&TC Ry. Co. survey.	10 6 33 Vol. 63 Page 554
15	North American Oil and Gas Company to F. C. Henderson, Inc.	Nov. 25, 1933	Gas rights under lease covering S ½ of S ½ of of N ½ Section 85, Blk. 46, H&TC Survey.	
16	L. M. Fischer to J. Wood Glass	July 21, 1934	13/16 of oil and gas lease covering 1891/2 acres lying along S. side Sections 85, 6, 7, particularly described in Deed from Joe Whittenburg to Lessor.	8-24-34 Vol. 65 Page 596

Other Assignments and Contracts

17	J. M. Sanford to F. C. Henderson	July 16, 1929	E. surface lease of E. 10 acres of that part of W ½ of S. 46 acres of N ½ Survey 82, blk. 46, H&TC Ry. Co.	2-26-30 Vol. 54 Page 358

[fol. 367]

Exhibit A - Continued

Other Assignments and Contracts (Continued)

No.	Makers	Date	Description	Date Recorded
18	F. C. Henderson to F. C. Henderson, Inc.	Feb. 12, 1930	Rights under Barnes, Deal, Oil Operator's trust et al and Maupin contracts being Nos. 1, 2, 3, and 4 above	Vol. 54 Page 317
19	F. C. Henderson to F. C. Henderson, Inc.	Feb. 12, 1930	Gasoline manufacturing plant at Sanford, Texas and lease from J. M. Sanford to F. C. Henderson, referred to in No. 17	2 20 30 Bill of sale of Records Vol. 2 Page 161
20	Bessie Rubin to F. C. Henderson, Inc.	Sept. 15, 1933	Survey No. 1 S. F. 12952 D. Rubin, Grantee; Survey No. 2 S. F. 12953 D. Rubin, Grantee; Survey No. 5 S. F. 12956 D. Rubin, Grantee, containing in all 47.38 acres.	10 12 33 Vol. 63, Page 565
21	F. C. Henderson, Inc. to The Henderson Co.	Aug. 21, 1934	Covers Nos. 1-20 inclusive.	Filed for record Nov. 1, 1934
[fol. 368]				
22	F. C. Henderson, Inc. to The Henderson Co.	Aug. 31, 1934	Gasoline manufacturing plant at Sanford, Texas and lease from J. M. Sanford to F. C. Henderson, referred to in No. 17.	Filed for record Nov. 1, 1934.
23	J. Wood Glass to the Henderson Co.	Nov. 9, 1934	All rights under No. 12 above.	Filed for record Dec. 1, 1934.
24	F. C. Henderson to F. C. Henderson, Inc.	Nov. 9, 1934	Rights under No. 17 above.	Filed for record Dec. 1, 1934.
25	F. C. Henderson, Inc. to The Henderson Co.	Nov. 10, 1934	Rights under No. 17 above.	Filed for record Dec. 1, 1934.

3. Casinghead Gas Contract

This Contract made and entered into this 17 day of May 1933, by and between R. E. Underwood hereinafter called Seller, whether one or more, and F. C. Henderson, Inc., of Tulsa County, State of Oklahoma, hereinafter called Buyer. [fol. 369] Witnesseth, That whereas the Seller owns oil and gas leases or oil and gas leasehold rights in and to lands situated in the County of Hutchinson, State of Texas, and more particularly described as follows,

All of the North 80 acres of J. T. Williams Survey No. One (1) located by virtue of Certificate Number 1233, State Abstract Number 506, and patented to Gunter & Munson, March 26, 1909, by Patent Number 540, Vol. 38.

And Whereas, the Buyer has constructed and is now operating a Casinghead Gasoline Plant:

Subject of Contract:

1. Seller covenants and agrees that Seller is the owner of valid and subsisting oil and gas mining lease or leases covering the lands above described, and that Seller is now operating or will operate thereon oil and gas or gas wells from which gas commonly known and herein referred to as casinghead gas, is or will be produced.

Sale and Purchase:

2. Seller hereby sells and agrees to deliver to Buyer, and Buyer thereby purchases and agrees to accept and pay for all the casinghead gas now being or hereafter to be produced from each and all the oil and gas wells on said premises on the terms and subject to the conditions and limitations hereinafter stated, however, Buyer shall [fol. 370] not be required to take more than a daily average of twenty-five per cent (25%) of the open flow, but it is understood that Buyer shall have the option of accepting and paying for casinghead gas in excess of twenty-five per cent (25%) of the open flow subject at all times to the rules and regulations made and promulgated by Federal or State authority, and should Buyer fail to exercise said option of accepting and paying for said excess gas, then Seller shall have the right to dispose of said excess casinghead gas elsewhere.

Term:

3. This contract shall remain in full force and effect for a period of Ten (10) years from the date hereof, and as long thereafter as casinghead gas can be profitably produced by the Sellers and profitably utilized by the Buyer, or full term of lease or any extension thereof.

Delivery:

4. Delivery of casinghead gas shall be made at the casingheads of the wells, or at a vapor tight flow tanks to be

furnished by Seller, and delivery and acceptance of gas shall begin within Thirty days from date of this contract.

Price:

5. Buyer agrees to pay for casinghead gas, delivered hereunder, a price per thousand cubic feet to be determined [fol. 371] as follows: The gasoline content of the gas, per thousand cubic feet shall be ascertained by field tests as hereinafter provided. The price per thousand cubic feet of casinghead gas shall be established or arrived at by multiplying twenty-five per cent (25%) of such gasoline content per thousand cubic feet, when the gasoline content is under two (2) gallons per thousand cubic feet, by the average F.O.B. plant price quoted by the National Petroleum News for like grade of gasoline for the fiscal month during which the casinghead gas was delivered; and when the gasoline content is two (2) gallons or more per thousand cubic feet, the price per thousand cubic feet of casinghead gas shall be established or arrived at by multiplying thirty-three and one-third, (33⅓) per cent of such gasoline content per thousand cubic feet by the average F.O.B. price quoted by the National Petroleum News, for like grade of gasoline for the fiscal month during which the casinghead gas was delivered. To illustrate; if the gasoline content of the casinghead gas shall be determined to be three (3) gallons per thousand cubic feet, and the average price per gallon of natural gasoline during the month for which settlement is to be made was nine (9¢) cents, then the price of said casinghead gas delivered to Buyer during the month for which settlement is to be made shall be nine (9¢) cents [fol. 372] per thousand cubic feet.

Royalty:

6. Buyer agrees to settlement with the lessors in the lease or leases hereinabove mentioned and described, for the royalty accruing on casinghead gas sold and delivered to Buyer under the terms of this agreement. The amount of sums so paid to be deducted from the amount or sums due from Buyer for casinghead gas delivered to it hereunder.

Date of Payment:

7. Buyer shall on or before the 25th day of each month deliver to Seller a full and complete statement of casing-

head gas delivered during preceding month and shall at the same time make full payment for all casinghead gas delivered during the preceding month less any sum or sums paid to lessors as royalty, as hereinabove provided. Should Seller decide to check the charts of Buyer showing the amount of gas run from Seller's lease, Buyer agrees upon request to furnish said meter charts to Seller for inspection only. Same to be returned to Buyer as soon as Seller has checked same.

Residue:

8. It is understood and agreed that Buyer shall return to the nearest boundary line of Seller's respective leases [fol. 373] above described sufficient dry or residue gas for the usual and ordinary and/or any new or advanced method of development and operation of said respective leases, the amount of residue gas so to be returned not to exceed, in any event, the amount of quantity remaining from the casinghead gas delivered to Buyer from said respective leases after the extraction of gasoline therefrom less the proportionate part of said residue gas necessary for gasoline plant operations; Provided, that in the event the dry or residue gas to be returned by Buyer hereunder shall be insufficient in quantity for the usual and ordinary and/or any new or advanced methods of development and operation of said respective leases, Seller hereby reserves the right to use casinghead gas from the respective leases for such purposes. Utilization of dry or residue gas returned by Buyer shall be at Seller's risk. It is understood and agreed that if the dry or residue gas remaining after the extraction of gasoline from casinghead gas shall be more than sufficient for the purposes above set forth, and if Buyer shall sell all or any part of such excess or surplus, then and in that event Buyer shall account to Seller and the royalty owners for fifty (50) per cent of the net pro- [fol. 374] ceeds of the sale of such dry or residue gas, settlement therefor to be made at the same time and in the same manner as payments for casinghead gas. As a basis of settlement for the sale of dry or residue gas, it shall be determined how much dry or residue gas Seller was entitled to have returned and the amount that actually was returned during the month for which settlement is to be made, and the difference shall be deemed to be the amount available

for sale, in the proceeds of the sale of which Seller is entitled to participate. It is understood, however, that Buyer is purchasing casinghead gas from other leases and lease owners for handling through Buyer's gasoline plant and that fifty (50%) per cent of the net proceeds of the sale of residue gas from said plant shall therefore be distributed to said leases and lease owners ratably in the proportion that the amount available for sale from each lease bears to the total amount available for sale from all of said leases, provided that in the event any portion of such residue gas shall be sold or utilized in the manufacture of carbon black, the Seller and royalty owners shall participate in the net proceeds from the sale of such gas only to the extent of the amount of gas produced by the well or wells of Seller, for which permit for use for carbon [fol. 375] black manufacture has been obtained from the Railroad Commission of the State of Texas, or under laws which may be hereinafter enacted by any other legally constituted body, and where permits are obtained for use of gas from well or wells of other Sellers of gas to buyer for manufacture of carbon black, and Buyer sells and delivers a less amount than the total amount of gas for which permits have been issued, then fifty (50%) per cent of the proceeds from the sale of such gas shall be distributed ratably to such lease owners on whose leases such permits have been issued, in the proportion that the amount for which permits have been issued, and which is available for sale from each lease, bears to the total amount available for sale and actually sold and delivered from all such leases.

Title:

9. Buyer shall not be required to make payment for gas received by it hereunder until Seller shall have submitted abstracts of title showing good title to said leases to be vested in Seller, and that Seller has good right to sell said casinghead gas, all to the satisfaction of attorneys of Buyer, provided, however, if the title of Seller is thereafter questioned or involved in litigation, Buyer shall have the right to withold payment during the pendency of such litigation, or until Seller's title is freed from such ques- [fol. 376] tion, or until Seller furnishes bond conditioned to save Buyer harmless, with surety acceptable to Buyer.

Test:

10. The gasoline content of the gas, to be metered as hereinafter provided, shall be determined by a filed compression test in the manner prescribed, as approved February 15, 1920, in the regulations of the United States Department of the Interior for such tests, and according to the specifications of equipment and method as set out in the Code developed and jointly approved by the Natural Gas Association of America and the Association of Natural Gasoline Manufacturers, June 1, 1927, however, should the lean-ess of the gas make the use of the charcoal absorption method more efficient, it shall be used at the election of the Seller; and said charcoal tests shall be made in the manner prescribed, and in accordance with specifications for apparatus and methods as outlined by the Natural Gas Association with tail absorber. The tests for gasoline content, air content and specific gravity of the gas shall be made quarterly, at the expense of buyer. Additional tests may be made at any time upon the written request of either party, the party requesting such test or tests to pay the cost [fol. 377] thereof. The result of such tests shall be used in computing the gas price until the next tests are made. Buyer shall notify Seller in writing at least five (5) days previous to the test in order that Seller may have a representative present. Seller may at Seller's option and expense, make such tests with Seller's own appliances in the presence of a representative of Buyer. The tests shall be computed on the basis of a pressure of four (4) ounces above atmospheric pressure and of temperature of sixty (60) degrees Fahrenheit.

Meter:

11. The casinghead gas delivered hereunder shall be measured by a standard orifice meter to be installed and maintained by Buyer. The quantity of gas shall be computed on the basis of four (4) ounces to the square inch above atmospheric pressure of fourteen and four-tenths (14.4) pounds per square inch at a temperature of sixty (60) degrees Fahrenheit. Buyer shall test and if necessary adjust and repair, said meter at the time the tests for gasoline content are made. The meter may be tested at any time on the demand of either party, and the ex-

pense of such tests shall be borne by the party demanding same if the meter is found to be correct. If the meter is [fol. 378] found to be incorrect, the cost of the test shall be borne by Buyer. If the meter is within three (3%) per cent correct, it shall be considered as correct. Should the meter fail to register, or if it should incorrectly register the amount of gas delivered, the amount to be paid for per day by Buyer during such time shall be the average per day for the last preceding thirty (30) days during which a correct meter reading was had. Seller may at his own expense, if desired, install a meter or meters of his own on Buyer's gathering line on said lease, to check the meters of Buyer.

Air Content:

12. If at any time the casinghead gas delivered hereunder shall contain more than 10% of air, all such air in excess of 10% shall be deducted from meter readings for the purpose of making payment for gas. Tests shall be made by the Buyer. If tests so made are not satisfactory to Seller, they may demand further tests to be made in the presence of their representative. Seller agrees to use due care in the operation of said wells and to keep the casingheads and casing any lines or other equipment belonging to Seller sufficiently tight to reduce to a minimum the amount of air in said gas and when any well or wells be [fol. 379] taken out of service for repairs, Seller shall shut same off from Buyer's gathering lines by suitable stop cocks, provided that if the air content shall be in excess of 10% and Buyer shall deem the same to be detrimental to Buyer's plant. Buyer shall have the right to discontinue acceptance of gas hereunder until air content shall be reduced to point not to exceed 10%.

Drip:

13. Buyer shall keep reasonably clear of obstruction all its pipe lines through which said gas is being delivered and shall own all liquid collected in such lines.

Tanks:

14. Buyer may, upon approval of Seller, install suitable equipment on Seller's storage tanks for purpose of saving

and utilizing vapors from said tanks for manufacture of gasoline, provided that any such utilization of tank vapors shall not lower the price obtained for crude oil.

Right of Way:

15. Seller grants to Buyer, so far as Seller has the right to do so, right of way on said lease or leases for such pipe lines and other equipment as may be necessary with full right to do thereon all acts necessary or convenient for the carrying out of the terms of this contract. All equipment placed on said lease or leases by Buyer shall be and remain [fol. 380] its property and be subject to removal by it at any time.

Unprofitable Gas:

16. Seller agrees to sell and deliver to Buyer and Buyer agrees to accept and pay for, subject to the provisions of paragraph two, all casinghead gas produced from the lands above described showing a gasoline content of three-tenths (3/10) gallon or more of gasoline per thousand cubic feet of gas. It is further understood and agreed that Buyer shall have the option of accepting and paying for all casinghead gas showing a gasoline content of less than three-tenths (3/10) gallon of gasoline per one thousand cubic feet of gas as determined by tests hereinafter provided for. Provided, that if the casinghead gas from said leases being insufficient in volume of gasoline content, or for any other cause becomes unprofitable for the extraction of gasoline therefrom, Buyer may at its option cease taking the gas therefrom so long as such condition exists; and it is further provided that if at any time the volume of gasoline content of the gas which Buyer is able to procure in the vicinity of said gasoline plant, or if any other cause beyond its control, shall render the operation of said gasoline plant unprofitable, Buyer may at its option discontinue the purchase of casinghead gas [fol. 381] under this contract, and this contract shall terminate as to both parties.

Well Pressure:

17. Seller agrees to maintain a back pressure on the wells on the above described lands sufficient to deliver casinghead gas into Buyer's lines at point of delivery at a minimum

pressure of sixty (60) pounds per square inch gauge, however, should said back pressure in the opinion of the Seller adversely affect the product of oil from Seller's wells Seller may so notify Buyer and thereafter discontinue the maintaining of any back pressure, provided further, should Seller discontinue the maintaining of the minimum back pressure above referred to the Buyer may at its option discontinue the purchase of casinghead gas under this contract and this contract shall terminate as to both parties.

Plant Suspension:

18. Buyer shall not be required to take and pay for gas not utilized during any period of plant suspension due to fire, flood, strikes, lack of water, accidents, or any circumstances beyond Buyer's control.

19. This contract is subject to all present and future orders, rules and regulations of the oil and gas division of [fol. 382] the Railroad Commission of the State of Texas, and applicable thereto or affecting the same.

Records:

20. Should Seller desire to check the office records of Buyer covering the gas delivered by Seller to Buyer, or any other records, in which Seller is interested, he shall have the right and privilege of so doing, but only during regular office hours of Buyer.

Product Covered:

21. The parties to this contract agree that the term "casinghead gas" and the term "oil wells" as used in this agreement shall not be restrictive as to the gas or source of the gas agreed to be delivered by the Seller and purchased by the Buyer, but that the term "casinghead gas" shall include all gas that may be produced from any well drilled on said leased premises which has a gasoline content of 30/100 of a gallon or more per thousand cubic feet, determined by charcoal test in the manner set out herein, and the term "oil well" shall include any well drilled on said premises for oil and gas, where the gas from such well may be utilized for the manufacture of gasoline under present laws of the State wherein said lands are situated, or any rules or laws that may hereafter be enacted by proper authority.

22. This agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

(Signed) R. E. Underwood, Seller. (Signed) F. C. Henderson, Buyer.

[fol. 383] 4. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above, except that it does not contain the provision "Production Covered" contained in No. 3, above. The Sellers are John J. Gordon and W. Latney Barnes; the Buyer is F. C. Henderson. The leasehold interest covered by the contract is:

Southwest Quarter (S.W. ¼) of West Half (W. ½) of the North 80 acres of South 320 acres of Section 83, Block 46, H & T C Survey in Hutchinson County, Texas.

The agreement is dated June 25, 1929.

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5. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above. The Seller is T. M. Deal; the Buyer is F. C. Henderson. The leasehold interest covered by the contract is:

All of the North one-half of the South One Hundred Sixty acres (N. ½ S. 160) of Section Number Eighty-one (81) in Block 46, located by virtue of Certificate No. 48 6773 issued to the Houston & Texas Central Railroad Company Survey, State Abstract Number 89, and patented to said Railroad Company, May 14, 1889, by Patent No. 113, Volume No. 110, and being located in Hutchinson County, Texas.

The agreement is dated July 2, 1929.

[fol. 384] 6. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above. The Seller is W. A. Maupin; the Buyer is F. C. Henderson. The leasehold interest covered by the contract is:

The North one-half and the Southeast one-fourth of the Northwest one-fourth of the North one-half of the South 320 acres of Section 83, Block 46, H. & T. C. Ry. Co. Survey, located in Hutchinson County, Texas.

The agreement is dated July 16, 1929.

7. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above. The Seller is The Texorado Oil & Gas Company, a Texas corporation; the Buyer is F. C. Henderson. The leasehold interest covered by the contract is:

The North one-half (N. ½) of the South One Hundred Sixty (160) Acres of Section Eighty-three (83), Block Forty-six (46), H. & T. C. Ry. Co. Survey, containing Eighty (80) acres of land located in Hutchinson County, Texas.

The agreement is dated January 22, 1931.

Attached to this contract are the following:

Amarillo, Texas, January 22, 1931.

F. C. Henderson Company, Inc., Tulsa, Oklahoma.

[fol. 385] Attention Mr. F. C. Hall

Gentlemen:

In connection with the Casinghead Gas Contract this day signed between ourselves and your Corporation, you are advised that we understand and agree that we are to pay for one-half of the construction of a pipe line of sufficient capacity to transport gas from our property to your plant, it being understood that you are to finance the construction of such line and to charge our part of the cost to the purchase price of gas purchased from us and to apply one-half of the revenue due to us under our contract each month to the cost of construction until our one-half of the cost of construction is paid in full.

In this connection, we understand that you agree to submit to us, after construction is finished, duplicate itemized invoices of all material used, and duplicate time sheets of

all labor and expenses incurred in such construction, and it is further understood that after the construction of said line is paid for in full that we own one-half of the line.

If the above is clear to you and it is understood as stated herein, you will please sign this letter on the line in the lower left-hand corner signifying your acceptance of this proposition.

Very truly yours, The Texorado Oil & Gas Company,
by (Signed) John Hancock, Secretary. (Seal.)

Accepted: F. C. Henderson Company, Inc., by (signed) F. C. Hall, General Manager.
O.K. (Signed) John T. Bottom, Pres.

[fol. 386] Amarillo, Texas, January 22, 1931.

F. C. Henderson Company, Inc., Tulsa, Oklahoma.

Attention Mr. F. C. Hall

GENTLEMEN:

In connection with the Casinghead Gas Contract this day signed between ourselves and your Corporation, you are advised that we understand and agree that we are — pay for one-half of the construction of a pipe line of sufficient capacity to transport gas from our property to your plant, it being understood that you are to finance the construction of such line and to charge our part of the cost to the purchase price of gas purchased from us and to apply one-half of the revenue due to us under our contract each month to the cost of construction until our one-half of the cost of construction is paid in full.

In this connection, we understand that you agree to submit to us, after construction is finished, duplicate itemized invoices of all material used, and duplicate time sheets of all labor and expenses incurred in such construction, and it is further understood that after the construction of said line is paid for in full that we own one-half of the line.

If the above is clear to you and it is understood as stated herein, you will please sign this letter on the line in the lower left-hand corner signifying your acceptance of this proposition.

Very truly yours, The Texorado Oil & Gas Company,
(Signed) by John Hancock, Secretary. (Seal.)

[fol. 387] Accepted F. C. Henderson Company, Inc., (Signed) by F. C. Hall, General Manager.
O.K. (signed) John L. Bottom, Pres.

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8. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above. The Seller is Bessie Rubin, joined by her husband Dave Rubin; the Buyer is F. C. Henderson, Inc., a Maine corporation. The leasehold interest covered by the contract is:

Survey No. 1, S. F. 12952, D. Rubin, Grantee;
Survey No. 2, S. F. 12953, D. Rubin, Grantee;
Survey No. 5, S. F. 12956, D. Rubin, Grantee; and
Survey No. 6, S. F. 12957, D. Rubin, Grantee, containing in all 57.64 acres of land, more or less, located in Hutchinson County, Texas.

The agreement is dated September 14, 1933.

On the margin of the first page is the following written notation:

"for the purpose of the extracting of the gasoline content therefrom or for any other purpose."

[fol. 388] 9. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above. The Seller is North American Oil and Gas Company; the Buyer is F. C. Henderson, Inc. The leasehold interest covered by the contract is:

Bradenhead gas from Bivins well No. 1-86, center of the South 320 acres of the North 450 acres of Section 86, Block 46, H. & T. C. Survey, located in Hutchinson County, Texas.

The agreement is dated August 31, 1933.

10. Casinghead Gas Contract

This contract is on the same form and contains substantially the same terms and provisions as No. 3, above, with the following exception:

On the first page, the following paragraphs are inserted before the form denominated "Subject of Contract":

Whereas, on February 8, 1933, the Railroad Commission of Texas issued a permit to Seller, under authority of Article 6008, Revised Civil Statutes of 1925, to produce gas from the wells located upon the property above described, which wells have heretofore been classified by the Railroad Commission of Texas as gas wells, and from which wells oil is not being produced, and to market the same to the extent of twenty-five (25%) per cent of the open flow of such wells, to Buyer, for the purpose of ex- [fol. 389] tracting the gasoline content therefrom in Buyer's said gasoline plant; and,

Whereas, It is the deaire of Seller and Buyer to contract with reference to the sale and purchase of that character of gas capable of being produced from the wells located upon the above described land, not commonly known as "Casinghead Gas", or the gas produced from the oil bearing strata, and with the oil, upon the following terms and conditions, to-wit:

The Sellers are L. M. Fischer, Trustee, Paramount Oil Corporation, L. M. Fischer, individually, Ted Harris, John McNeill, and W. G. Tune; the Buyer is F. C. Henderson, Inc. The leasehold interest covered by the contract is:

The West Half (W. ½) of the North 275 acres of Section 82, Block 46, H. & T. C. Ry. Co. Survey, located in Hutchinson County, Texas.

The agreement is dated September 13, 1933.

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11. Assignment

Know all men by these presents: That,

Whereas, on the 6th day of February, 1926, a certain oil and gas mining lease was made and entered into by and between J. M. Sanford, as lessor, and Ross Mineral Interests, Inc., as lessee, upon and covering the following described lands, to-wit:

The north 160 acres of the south 240 acres of the north 400 acres of Section 87, Block 46, H. & T. C. Ry. Co. Survey, in Hutchinson County, Texas, and other lands,

[fol. 390] which oil and gas mining lease is of record in Volume 31, at page 234, of the Deed Records of said Hutchinson County, Texas: and;

Whereas, on the 10th day of June, 1930, a certain agreement in writing was duly executed and acknowledged by the said J. M. Sanford, as reflected at page 87, Volume 56 of the Deed Records of Hutchinson County, Texas, reference to which is here made for all purposes, under and by virtue of which the lands specifically described above became burdened with the sum of Four Thousand ($4,000.00) dollars, said Four Thousand ($4,000.00) Dollar oil and gas payment to be paid from one half of the seven eighths (½ of 7/8), of the net proceeds received from the sale of oil, gas and casinghead gas produced, saved and marketed from said 160 acre lease aforesaid, when, as and if same is produced, saved and marketed, until the said J. M. Sanford shall have received said sum of Four Thousand ($4,000.00) Dollars; and,

Whereas, the undersigned, Sam C. Watt, and Karl A. Crowley, are the owners of said oil and gas mining lease aforesaid, upon and covering the 160 acre tract of land aforesaid, subject to the payment of J. M. Sanford of said sum of Four Thousand ($4,000.00) Dollar oil, gas and casing-head gas payment aforesaid.

Now, therefore, I Sam C. Watt, of Hot Springs, Arkansas, the present owner of three fourths of seven-eighths (3/4 of 7/8) of said oil and gas mining lease aforesaid, in so far as same covers and pertains to said 160 acres of land aforesaid, for and in consideration of Ten Dollars and other good and valuable consideration, the receipt of which [fol. 391] is hereby acknowledged, and of the covenants and agreements hereinafter contained on the part of the assignee to be paid, kept and performed, does hereby bargain, sell, transfer, assign and convey three-fourths of seven-eighths (3/4 of 7/8) title and interest of the original lessee and present owner in and to said lease and rights thereunder insofar as it covers the 160 acres of lands specifically described aforesaid, together with all personal property used or obtained in connection therewith, to F.

C. Henderson, Inc., of Tulsa, Oklahoma, its successors, assigns and/or legal representatives, subject to the hereinafter terms, conditions, and payments, to-wit:

By acceptance of this assignment, the assignee assumes and agrees to pay in manner and form provided in the J. M. Sanford agreement aforesaid, said sum of Four Thousand ($4,000.00) Dollars.

In addition to the payment of the said sum of Four Thousand Dollars ($4,000.00), to J. M. Sanford, as aforesaid, assignee agrees to pay to assignor the sum of Sixteen Thousand Five Hundred Dollars ($16,500.00), both the sum which is to be paid to J. M. Sanford and that which is to be paid to the assignor, shall be paid from the twenty-five (25) per cent royalties upon and covering oil and/or gas, and/or casing-head gas, produced, saved and marketed from any and all wells now upon or which may be drilled upon said lands, and the lease thereon hereby assigned and conveyed, said twenty-five per cent royalties to be distributed and paid as follows, to-wit:

[fol. 392] Said J. M. Sanford is to receive one half thereof and the said Sam C. Watt one half thereof until the sum of Four Thousand Dollars ($4,000.00) has been paid to J. M. Sanford, according to the terms of the written recorded agreement above referred to. After the Four Thousand Dollars ($4,000.00) has been paid to J. M. Sanford, as above specified, then the said Sam C. Watt is to receive all of said twenty-five per cent royalties until he shall have been paid the sum of Twelve Thousand Dollars ($12,000.00). After Sam C. Watt has been paid Twelve Thousand Dollars ($12,000.00), then he shall receive three fourth- of the twenty-five per cent royalties until he shall have reeeived the further sum of Forty-five Hundred ($4,500.00) Dollars.

When the assignor shall have received the sum of Sixteen Thousand and Five Hundred ($16,500.00) Dollars, provided in this assignment, to be paid, all without interest, whether from oil, gas, casinghead gas or all of them, this assignment shall become absolute and the interest of the said Sam C. Watt shall terminate.

It is agreed and understood that immediately upon acceptance by the assignee of this assignment, that it will enter upon the leased and assigned premises and recondition the well upon said premises, and place same in con-

dition for the taking therefrom and/or casinghead gas, and that it will use due diligence in putting said well into condition by so cleaning out and equipping the same for such purposes, and that it will immediately thereafter commence taking and/or marketing therefrom oil and/or gas [fol. 393] and/or casinghead gas, and that it will continue to do so from day to day, and from time to time, acts of God and unavoidable contingencies excepted, so long as said leased premises or wells thereon located produces or is capable of producing such products in paying quantities; assignee shall not be required to take more than daily average of 25% of the open flow, but it is understood that assignee shall have the option of producing a greater amount, subject at all times to the rules and regulations made and promulgated by Federal or State authorities, it being specifically understood that by acceptance of this assignment that the assignee shall not be required to operate said leased premises in violation of the rules and regulations made and promulgated by Federal or State authority.

It is contemplated that the assignee, by acceptance hereof, acquired the leased premises for the purpose of utilizing casinghead gas or natural gas, by selling and/or delivering the same to its casinghead gasoline plant or other plants or markets which it may find as a market; and that for the purpose of determining the amount to be paid, from month to month until such time as the $4,000. obligation of J. M. Sanford and the $16,500.00 to the assignor hereof, as aforesaid, twenty-five (25%) per cent of the gross price received for production shall be treated as royalty, to be paid as above provided. The basis of settlement for said 25% royalty shall be as follows:

Assignee agrees to pay for casinghead gas, or natural gas, marketed by it, a price per thousand cubic feet, to be determined as follows:

[fol. 394] The gasoline content of the gas, per thousand cubic feet shall be ascertained by field tests as hereinafter provided. The price per thousand cubic feet of casinghead gas shall be established or arrived at by multiplying twenty-five per cent (25%) of such gasoline content per thousand cubic feet, when the gasoline content is under two (2) gallons per thousand cubic feet, by the average F.O.B. Plant price quoted by the National Petroleum News for

like grade of gasoline for the fiscal month during which the casinghead gas was delivered; and when the gasoline content is two (2) gallons or more per thousand cubic feet, the price per thousand cubic feet of casinghead gas shall be established or arrived at by multiplying thirty-three and one-third (33 1/3) per cent of such gasoline content per thousand cubic feet by the average F.O.B. price quoted by the National Petroleum News, for like grade of gasoline for the fiscal month during which the casinghead gas was delivered. To illustrate: if the gasoline content of the casinghead gas shall be determined to be three (3) gallons per thousand cubic feet, and the average price per gallon of natural gasoline during the month for which settlement is to be made was nine (9c) cents, then the price of said casinghead gas delivered to Buyer during the month for which settlement is to be made shall be nine (9c) cents per thousand cubic feet.

Assignee agrees that a settlement will be rendered by it to assignor, reflecting all moneys had and received from wells upon the leased premises, and payment will be made [fol. 395] to assignor, as above provided, on or before the 25th day of each and every calendar month, until such time as the sums of money, hereinabove provided to be paid, shall be so paid.

It is understood and agreed that the F. C. Henderson, Inc., shall begin its operations within thirty-days after the execution of this assignment and continue said production and marketing oil, gas, and/or casinghead gas so long as said leased premises or wells thereon located produce or are capable of producing the products above described in paying quantities, said assignee not being required to take more than a daily average of twenty-five per cent of the open flow as above stated, and that it shall continue operating without interruption, as above stated, except when prevented by acts of God or unavoidable contingencies. Failure to perform its agreement by the assignee shall cause a forfeiture of this assignment and the property shall revert to the assignor.

The undersigned, Sam C. Watt, for himself, his heirs, successors, assigns and legal representatives respectively, does hereby covenant with the assignee, its successors and assigns, that he is the lawful owner of three fourths of said

oil and gas lease herein assigned, and three fourths of the rights and interests thereunder, and three fourths of the personal property thereon or used in connection therewith, subject to the Four Thousand ($4,000.00) Dollar obligation, aforesaid, to be paid to J. M. Sanford, his heirs and assigns; that I have good right and authority to sell and convey the same, and that all rentals and royalties due and [fol. 396] payable thereunder have been fully paid, except as pointed out herein, if any; and that except as to said $4,000.00 payment to J. M. Sanford, assignor warrant my three-fourths interest in said leased premises and the personal property thereon, or used in connection therewith, to be free and clear of all liens and other encumbrances, and hereby warrant.

It is understood that — are some taxes now due on my three-fourths interest in said lease, which I agree to pay out of the first royalties received by me under the terms of this assignment and agreement.

In Witness Whereof, I, the said Sam C. Watt, have signed and sealed this instrument this 26th day of May, 1933.

(Signed) Sam C. Watt. (Seal.)

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12. Assignment

This assignment was executed by Karl A. Crowley to F. C. Henderson, Inc. on June 16, 1933, and covers the interest of said Crowley in and to the property described in No. 11, above, and contains substantially the same terms and provisions as said assignment of Sam C. Watt copied above, except for the difference in consideration.

13. Allowable Fixed by Railroad Commission

[fol. 397] Allowable of Sweet Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective October 1st, 1935

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	2	Sanford	81
Henderson	1	Con-Whit.	399
Henderson	2	Con-Whit.	...
Henderson	1	N. Amer.-Sanford	404
Henderson	1	Sanford	832
N. Amer-Shell	1	Bivins	399
Polo Oil Co.	1	Sanford	568
Reliance Devel. Co.	1	Sanford	345
Rubin	2	Rubin	225
Rubin	3	Rubin	475
Rubin	4	Rubin	505
Underwood	1	Johnson	387
Texorado O&G Co.	1	Sanford	315
Texorado O&G Co.	2	Sanford	822
Total			5757

[fol. 398] 14. Allowable Fixed by Railroad Commission

Allowable of Sour Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective October 1st, 1935

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	1	Sanford	2995
Paramount	1	Sanford	585
Paramount	2	Sanford	1887
Paramount	3	Sanford	1550
Phillips	1	Operators	2604
Phillips	2	Operators	721
Skelly	1	Sanford	1937
Total			12,279

15. Allowable Fixed by Railroad Commission

Allowable of Sweet Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective December 11th, 1935

[fol. 399]

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	2	Sanford	
Henderson	1	Con-Whit.	609
Henderson	2	Con-Whit.	
Henderson	1	N. Amer. Sanford	623
Henderson	1	Sanford	1285
N. Amer-Shell	1	Bivins	629
Polo Oil Co.	1	Sanford	873
Reliance Develop. Co.	1	Sanford	530
Rubin	2	Rubin	346
Rubin	3	Rubin	729
Rubin	4	Rubin	775
Underwood	1	Johnson	596
Texorado O&G Co.	1	Sanford	485
Texorado O&G Co.	2	Sanford	1264
Total			8744

16. Allowable Fixed by Railroad Commission

Allowable of Sour Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective January 1st, 1936

[fol. 400]

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	1	Sanford	7049
Paramount	1	Sanford	1069
Paramount	2	Sanford	4609
Paramount	3	Sanford	3879
Phillips	1	Operators	5694
Phillips	2	Operators	1383
Skelly	1	Sanford	4683
Total			28,366

17. Allowable Fixed by Railroad Commission

Allowable of Sour Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective December 11th, 1935

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	1	Sanford	3315
Paramount	1	Sanford	589
Paramount	2	Sanford	2087
Paramount	3	Sanford	1698
[fol. 401] Phillips	1	Operators	2896
Phillips	2	Operators	732
Skelly	1	Sanford	2098
Total			13,415

18. Allowable Fixed by Railroad Commission

Allowable of Sour Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective February 1, 1936

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	1	Sanford	2407
Paramount	1	Sanford	489
Paramount	2	Sanford	1520
Paramount	3	Sanford	1253
Phillips	1	Operators	2088
Phillips	2	Operators	596
Skelly	1	Sanford	1569
Total			9,922

[fol. 402] 19. Allowable Fixed by Railroad Commission

Allowable of Sweet Gas Wells Belonging to the Henderson Company, as Fixed by the Railroad Commission in Its Order Effective February 1, 1936

Company	Well No.	Lease	M. C. F.
Deal O&G Co.	2	Sanford	128
Henderson	1	Con Whit.	615
Henderson	2	Con Whit.	
Henderson	1	N. Amer-Sanford	620
Henderson	1	Sanford	1298
N. Amer-Shell	1	Bivins	246
Polo Oil Co.	1	Sanford	883
Reliance Develop. Co.	1	Sanford	536
Rubin	2	Rubin	350
Rubin	3	Rubin	738
Rubin	4	Rubin	784
Underwood	1	Johnson	603
Texorado O&G Co.	1	Sanford	491
Texorado O&G Co.	1	Sanford	1279
Total			8581

[fol. 403] 20. Report

Residue Gas Sold by the Henderson Company to Combined Carbon Company

Month	Volume for Month in M. Cu. Ft.	Average Volume Per Day in M. Cu. Ft.
May, 1935	34,592	1,116
June	465,947	15,532
July	768,595	24,793
August	867,322	27,978
September	878,242	29,275
October	914,040	29,485
November	878,354	29,278
December	910,900	29,383
January, 1936	905,917	29,223
Total	6,623,309 M. cu. ft.	

[fol. 404] 21. ORDER OF RAILROAD COMMISSION

Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet Natural Gas in the Panhandle District of Texas

Austin, Texas, July 20, 1935.

Special Order Fixing Allowable Production of Sweet Natural Gas in the Panhandle District of Texas

Whereas, in conformity to House Bill No. 266, passed at the Regular Session of the 44th Legislature of the state of Texas, the Commission after due notice has held hearings on or before the 20th day of each calendar month, including the hearing held at Austin, Texas, on July 18, 1935, with respect to the existence and imminence of waste of Sweet Natural Gas in the state of Texas, and the prevention thereof, and

Whereas, the Engineering Department of the Railroad Commission of Texas made a detailed study of the various gas wells in the state of Texas, and in doing so tested each gas well in Texas for its daily producing capacity, its gravity, and its rock pressure, and this record was submitted to the Commission showing this information, and showing the producing capacity of each well in Texas, as expressed in cubic feet per day computed at a base pressure of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a stand-

[fol. 405] ard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method, and

Whereas, maps were submitted as evidence, showing the pressures of the various gas wells in Texas, and these maps were contoured according to fields which reflected the reservoir conditions of said fields, and

Whereas, said pressure maps reflected that the Panhandle field can be separated and divided into two (2) zones or fields without the creation of physical waste, and hereafter the Panhandle field, for proration purposes, shall be separated into the East Panhandle field and the West Panhandle field, and this point of division shall be a line which runs

due north and south through the Panhandle field along the east line of Sections 8, 9 & 10 of Block 3, I&GN RR Survey, Gray County. This line extends southward through the field and through the City of LeFors and changes its course southwestward to the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward approximately through the east side of Sections 3, 4, 5 & 6 straight southward through the remaining portion of the field. This line passes through the east line of Sections 2 and 3, Block "H", A. Wallace Survey, all in Gray County. Hereafter, until further notified, this line shall separate, for proration purposes, the East and West Panhandle gas fields, and

[fol. 406] Whereas, the Commission finds from a study by its Engineers and from evidence submitted to it at its hearing held in Austin, Texas, on July 18, 1935, that there are only approximately twelve (12) wells which are situated on acreage exceeding 640 acres, which represents approximately 1.5% of all wells in the Panhandle field, and

Whereas, it was testified by experts familiar with the conditions in the Panhandle field that the closer you drill wells together the more gas you will produce ultimately from the reservoir after the field has been depleted to its abandonment pressure.

Therefore, it is Ordered by the Railroad Commission of Texas that the Panhandle Gas field shall be divided into the East and West Panhandle fields, and the daily allowable for individual wells in the West Panhandle field shall be determined by dividing the allowable for the West Panhandle field into two (2) equal parts, and 50% of this allowable shall be distributed to each well in proportion to the relative producing ability of these individual wells, and 50% of the allowable shall be based on the number of acres containing each of these wells, and in no case shall more than 640 acres be allocated to any one well for the purpose of proration. The daily allowable for individual wells located in the East Panhandle field shall be determined by dividing the allowable of the East Panhandle field into two (2) equal parts, and 50% of the allowable shall be distributed to each well in proportion to the rela-

[fol. 407] tive producing ability of these individual wells, and 50% of the allowable shall be based on the number of acres containing each of these wells, and in no case shall more than 160 acres be allocated to any individual well.

It is Also Ordered, that, effective at 7 a. m., August 1, 1935, the daily allowable gas production for the West Panhandle field shall be 482,143,000 cubic feet per day, computed at a pressure base of four (4) ounces per square inch, above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method, and the allowable for the East Panhandle field shall be 88,407,000 cubic feet per day, computed at a pressure base of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method, and each well located in the East and West Panhandle fields shall produce a daily amount of gas as reflected by the proration schedules compiled by the Railroad Commission of Texas and marked "Exhibit A" which exhibit shall be available either at the Railroad Commission office at Pampa, Texas, or the Railroad Commission office at Austin, Texas.

It is Further Ordered that this Docket be kept open to [fol. 408] consider any claims of discrimination or hardship which might result by virtue of this order. The problem of carrying out the provisions of H. B. 266 is a complex and difficult one, especially in the enormous Panhandle field where there are so many diverse and conflicting interests and where the physical facts present so many complexities.

The Commission has made an intensive and comprehensive study of this field through its engineering staff and personal study and investigation. Their studies and investigations will be continued and as a result its monthly hearings, as provided in the Statute, the Commission will be afforded the opportunity to and will promptly correct any injustices or inequalities that may be inherent in its current order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman. C. V. Terrell, Commissioner. Lon A. Smith, Commissioner.

Attest: C. F. Petit, Secretary.

[fol. 409] 22. ORDER OF RAILROAD COMMISSION

Railroad Commission of Texas,

Oil and Gas Division

Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet Natural Gas in the Panhandle District of Texas

Austin, Texas, August 1, 1935.

Special Order Amending Order of the Railroad Commission Dated July 20, 1935, Fixing Allowable Production of Sweet Natural Gas in the Panhandle District of Texas

Whereas, pursuant to notice to all interested persons the Railroad Commission of Texas held a hearing at the Herring Hotel, Amarillo, Texas, on June 14 and 15, 1935, and at Austin, Texas, July 18 and 19, 1935, for the purpose of carrying out the requirements of House Bill 266, enacted by the Forty-fourth Legislature at its regular session, after which hearings it promulgated an order dated July 20, 1935, fixing the allowable production of sweet natural gas in the Panhandle District of Texas, and it is the desire of the Railroad Commission to amend said order of July 20, 1935, so that it may make additional findings of fact which it was the intention of the Railroad Commission to set forth in said order of July 20, 1935:

[fol. 410] Now, Therefore, it is Ordered that said order dated July 20, 1935, be and the same is hereby amended so that it shall hereafter read as follows:

From testimony introduced and witnesses heard at said hearings, the Commission makes the following findings of fact:

A. The purposes and intent of said House Bill 266 can be more effectively carried out by separating the Panhandle sweet gas field into two separate zones or two separate common reservoirs, one of which zones shall be known as the East Panhandle field and the other of said zones shall be known as the West Panhandle field. The point of division between said two fields shall be a line which runs due north and south through the Panhandle field along the

east line of Sections 8, 9 and 10 of Block 3, I&GN RR Survey, Gray County. This line extends southward through the field and through the city of LeFors and changes its course southwestward to the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward approximately through the east side of Sections 3, 4, 5 & 6 straight southward through the remaining portion of the field. This line passes through the east line of sections 2 and 3, Block "H", A. Wallace Survey, all in Gray County, Texas. The Commission finds that these two zones should be established on account of the following facts:

A low pressure area exists in Gray County which forms a physical reservoir barrier between the two fields and [fol. 411] makes the migration of gas impossible from either of said fields to the other. In addition to this reservoir condition, the pipe lines which withdraw gas from one of said fields do not now withdraw and have never withdrawn gas from the other of said fields and the lines of such companies do not extend into such other field.

B. The aggregate lawful volume of open flow or daily potential capacity to produce sweet gas from both the West Panhandle sweet gas field and the East Panhandle sweet gas field is in excess of the daily reasonable market demand for such gas from such fields to be utilized for lawful purposes.

C. It is necessary to restrict the production of gas from wells capable of producing sweet gas, from each of said fields, to comply with the requirements of said House Bill 266. Physical waste, both underground and overground, is now taking place in each of said fields; and the restriction of production when ratably distributed among the various wells in said fields, capable of producing sweet gas, will prevent physical waste as defined by said House Bill 266; will result in a greater ultimate recovery of gas from each of said fields; will result in a more efficient drainage from said reservoirs by the producing wells; and such restriction is necessary to protect and adjust the correlative rights and opportunities of the owners of the various wells in said fields capable of producing sweet gas.

D. The efficient drainage area of a gas well in the East Panhandle field, producing at 25% of the daily producing

[fol. 412] capacity, is 160 acres. Acreage surrounding any well in excess of that amount, therefore, should not be taken into account in allocating the allowable production among the various wells located in said field.

The evidence introduced at the hearings did not satisfy the Commission that wells located in the West Panhandle field, as described in Paragraph A above, have an efficient drainage area substantially different from those located in the East Panhandle field. The Commission does find, however, that on account of the lack of diverse fee and lease ownerships in said West Panhandle field and the widely spaced drilling program which has been followed in said field, it is equitable under present conditions to fix an acreage factor to be used in allocating allowable production among wells in said West Panhandle field substantially larger than that which is fixed for the East Panhandle field, and that no substantial inequities and injustices to operators in either of said fields will be occasioned by such an acreage factor being adopted for the West Panhandle field. For this reason, therefore, the Commission finds that the efficient drainage area of a gas well located in the West Panhandle field, under present conditions, is 640 acres.

E. To accomplish the purposes set forth in Paragraph C hereof, the total production of all wells in each of said fields should be restricted to the reasonable market de- [fol. 413] mand for lawful purposes for such gas from each of said fields, as found by the Commission.

For the month of August, 1935, or until otherwise ordered, the reasonable market demand for sweet gas for lawful purposes from the East Panhandle field is found to be 88,407,000 cubic feet per day, computed at a pressure base of four ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method.

The reasonable market demand for sweet gas for lawful purposes from the West Panhandle field until otherwise ordered is found to be 482,143,000 cubic feet of gas per day, computed on the basis set forth in the preceding paragraph.

It is Therefore Ordered as follows:

(1) Total Allowable.—The total daily allowable for all the wells located in the East Panhandle field and the West Panhandle field shall be the number of cubic feet of natural gas found by the Commission to constitute the reasonable market demand for sweet gas from each of said fields as set forth in paragraph E above.

(2) Basis of Allocation.—(a) One half of the allowable production from each of said fields shall be allocated among the various wells therein capable of producing sweet gas on a consideration of the relation of the potential-acres of [fol. 414] the particular field in which the well is located. Each well shall be permitted to produce that percentage of one half of the total allowable for said field that its potential-acres bears to the total potential-acres of the field in which it is located. To secure the potential-acres of any well, the open flow of the particular well, as found by the Commission, shall be multiplied by the number of acres in the tract or lease on which the well is located; provided that no well in the East Panhandle field shall be considered to be located on a tract or lease of more than 160 acres, and no well in the West Panhandle field shall be considered to be located on a tract or lease of more than 640 acres. Where more than one well is located on a tract or lease, the number of wells on a tract or lease shall be divided into the number of acres in same, and each well, for the purpose of determining its potential-acres, shall be considered to be located on the number of acres which is the quotient of this division, subject to the qualifications set forth in the preceding sentence. The potential-acres of each field shall be the sum arrived at by adding the individual potential-acres of all the wells located in said field capable of producing sweet gas.

(b) One half of the allowable production from each of said zones shall be allocated among the various wells therein, capable of producing sweet gas, on a consideration of the relation between the open flow of the individual wells and the total open flow of all the wells in said zone [fol. 415] capable of producing sweet gas. Each well shall be permitted to produce that percentage of one half of the allowable of the zone in which it is located, which its open flow bears to the total open flow of all of the wells in the field capable of producing sweet gas.

The total daily allowable of any well shall be the sum of the totals arrived at by an application of the methods set forth in Subdivisions A and B hereof. Where the total allowable for any well arrived at in this manner is less than 50,000 cubic feet of gas per day, such well shall nevertheless be permitted to produce 50,000 cubic feet of gas per day. It shall be considered a violation of this order for any well to produce an amount of gas in excess of its allowable as set forth in the schedules of the Commission.

(3) New Wells.—Where any new well, capable of producing sweet gas, is completed in either of said fields, such well until the next hearing of the Commission and the issuance of new allowables and schedules based thereon, shall be permitted to produce not in excess of 50,000 cubic feet of gas per day.

(4) Schedules.—The Commission, through its deputy supervisors in the field, will cause to be issued schedules setting forth, among other things, the potential acres of each well in the field involved, the total daily allowable production from each well and the percentage of its daily open flow which each such well shall be permitted to produce during the period covered by the order.

It is Further Ordered that this Docket be kept open [fol. 416] to consider any claims of discrimination or hardship which might result by virtue of this order. The problem of carrying out the provisions of House Bill 266 is a complex and difficult one, especially in the enormous Panhandle field where there are so many diverse and conflicting interests and where the physical facts present so many complexities.

The Commission has made an intensive and comprehensive study of this field through its engineering staff and personal study and investigation. Its studies and investigations will be continued and as a result of its monthly hearings, as provided in the Statute, the Commission will be afforded the opportunity to and will promptly correct any injustices or inequalities that may be inherent in its current order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner; Lon A. Smith, Commissioner.

Attest: C. F. Petet, Secretary. (Seal.)

23. Order of Railroad Commission

Railroad Commission of Texas

Oil and Gas Division

Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet Natural Gas in the Panhandle District of Texas

[fol. 417] Railroad Commission of Texas

Oil and Gas Division

Austin, Texas, August 5, 1935.

Special Order Amending Order of the Railroad Commission Dated August 1, 1935, Fixing Allowable Production of Sweet Natural Gas in the Panhandle District of Texas

Whereas, pursuant to notice to all interested persons the Railroad Commission of Texas held a hearing at the Herring Hotel, Amarillo, Texas, on June 14 and 15, 1935, and at Austin, Texas, July 18 and 19, 1935, for the purpose of carrying out the requirements of House Bill 266, enacted by the Forty-fourth Legislature at its regular session, after which hearings it promulgated an order dated August 1, 1935, fixing the allowable production of sweet natural gas in the Panhandle District of Texas, and it is the desire of the Railroad Commission to amend said order of August 1, 1935, so that it may make additional findings of fact which it was the intention of the Railroad Commission to set forth in said order of August 1, 1935:

Now, Therefore, it is Ordered that said order dated August 1, 1935, be and the same is hereby amended so that it shall hereafter read as follows:

From testimony introduced and witnesses heard at said hearings, the Commission makes the following findings of fact:

A. The purposes and intent of said House Bill 266 can be morely effectively carried out by separating the Panhandle sweet gas field into two separate zones or two separate common reservoirs, one of which zones shall be known [fol. 418] as the East Panhandle field and the other of said

zones shall be known as the West Panhandle field. The point of division between said two fields shall be a line which runs due north and south through the Panhandle field along the east line of Sections 8, 9 and 10 of Block 3, I&GN RR Survey, Gray County. This line extends southward through the field and through the city of LeFors and changes its course southwestward to the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward approximately through the east side of Sections 3, 4, 5 and 6 straight southward through the remaining portion of the field. This line passes through the east line of Sections 2 and 3, Block "H", A. Wallace Survey, all in Gray County, Texas. The Commission finds that these two zones should be established on account of the following facts:

A low pressure area exists in Gray County which forms a physical reservoir barrier between the two fields and makes the migration of gas impossible from either of said fields to the other. In addition to this reservoir condition, the pipe lines which withdraw gas from one of said fields do not now withdraw and have never withdrawn gas from the other of said fields and the lines of such companies do not extend into such other field.

B. The aggregate lawful volume of open flow or daily potential capacity to produce sweet gas from both the West Panhandle sweet gas field and the East Panhandle sweet gas field is in excess of the daily reasonable market demand for such gas from such fields to be utilized for lawful purposes.

C. It is necessary to restrict the production of gas from wells capable of producing sweet gas, from each of said [fol. 419] fields, to comply with the requirements of said House Bill 266. Physical waste, both underground and overground, is now taking place in each of said fields; and the restriction of production when ratably distributed among the various wells in said fields, capable of producing sweet gas, will prevent physical waste as defined by said House Bill 266; will result in a greater ultimate recovery of gas from each of said fields; will result in a more efficient drainage from said reservoirs by the producing wells; and such restriction is necessary to protect and adjust the correlative rights and opportunities of the owners of the various wells in said fields capable of producing sweet gas.

D. The efficient drainage area of a gas well in the East Panhandle field, producing at 25% of the daily producing capacity, is 160 acres. Acreage surrounding any well in excess of that amount, therefore, should not be taken into account in allocating the allowable production among the various wells located in said field.

The evidence introduced at the hearings did not satisfy the Commission that wells located in the West Panhandle field, as described in Paragraph A above, have an efficient drainage area substantially different from those located in the East Panhandle field. The Commission does find, however, that on account of the lack of diverse fee and lease ownerships in said West Panhandle field and the widely spaced drilling program which has been followed in said field, it is equitable under present conditions to fix an [fol. 420] acreage factor to be used in allocating allowable production among wells in said West Panhandle field substantially larger than that which is fixed for the East Panhandle field, and that no substantial inequities and injustices to operators in either of said fields will be occasioned by such an acreage factor being adopted for the West Panhandle field. For this reason, therefore, the Commission finds that the efficient drainage area of a gas well located in the West Panhandle field, under present conditions, is 640 acres.

E. To accomplish the purposes set forth in Paragraph C hereof, the total production of all wells in each of said fields should be restricted to the reasonable market demand for lawful purposes for such gas from each of said fields, as found by the Commission.

For the month of August, 1935, or until otherwise ordered, the reasonable market demand for sweet gas for lawful purposes from the East Panhandle field is found to be 88,407,000 cubic feet per day, computed at a pressure base of four ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method.

The reasonable market demand for sweet gas for lawful purposes from the West Panhandle field until otherwise

ordered is found to be 482,143,000 cubic feet of gas per day, computed on the basis set forth in the preceding paragraph. [fol. 421] Therefore, it is ordered by the Railroad Commission of Texas that the Panhandle Gas field shall be divided into the East and West Panhandle fields, and the daily allowable for individual wells in the West Panhandle field shall be determined by dividing the allowable for the West Panhandle field into two (2) equal parts, and 50% of this allowable shall be distributed to each well in proportion to the relative producing ability of these individual wells, and 50% of the allowable shall be based on the number of acres containing each of these wells, and in no case shall more than 640 acres be allocated to any one well for the purpose of proration. The daily allowable for individual wells located in the East Panhandle field shall be determined by dividing the allowable of the East Panhandle field into two (2) equal parts, and 50% of this allowable shall be distributed to each well in proportion to the relative producing ability of these individual wells, and 50% of the allowable shall be based on the number of acres containing each of these wells, and in no case shall more than 160 acres be allocated to any individual well.

It is Also Ordered, that, effective at 7 a. m., August 1, 1935, the daily allowable gas production for the West Panhandle field shall be 482,143,000 cubic feet per day, computed at a pressure base of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method, and the allowable for [fol. 422] the East Panhandle field shall be 88,407,000 cubic feet per day, computed at a pressure base of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method, and each well located in the East and West Panhandle fields shall produce a daily amount of gas as reflected by the proration schedules compiled by the Railroad Commission of Texas and marked "Exhibit A" which ex-

hibit shall be available either at the Railroad Commission office at Pampa, Texas, or the Railroad Commission office at Austin, Texas.

New Wells—Where any new well, capable of producing sweet gas, is completed in either of said fields, such well until the next hearing of the Commission and the issuance of new allowables and schedules based thereon, shall be permitted to produce not in excess of 50,000 cubic feet of gas per day.

Schedules—The Commission, through its Deputy Supervisors in the field, will cause to be issued schedules setting forth, among other things, the potential acres of each well in the field involved, the total daily allowable production from each well and the percentage of its daily open flow which each such well shall be permitted to produce during the period covered by the order.

It is Further Ordered that this Docket be kept open to consider any claims of discrimination or hardship which might result by virtue of this order. The problem of car- [fol. 423] rying out the provisions of House Bill 266 is a complex and difficult one, especially in the enormous Panhandle field where there are so many diverse and conflicting interests and where the physical facts present so many complexities.

The Commission has made an intensive and comprehensive study of this field through its engineering staff and personal study and investigation. Its studies and investigations will be continued and as a result of its monthly hearings, as provided in the Statute, the Commission will be afforded the opportunity to and will promptly correct any injustices or inequalities that may be inherent in its current order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner. (Seal.)

Attest: C. F. Petet, Secretary.

24. Order of Railroad Commission

Railroad Commission of Texas

Oil and Gas Division

Oil and Gas Docket No. 108

In re. Conservation and Prevention of Waste of Sweet and Sour Natural Gas in the Panhandle District of Texas

[fol. 424] Railroad Commission of Texas

Oil and Gas Division

Austin, Texas, September 25, 1935.

Special Order Fixing Allowable Production of Sweet and Sour Gas in the Panhandle District of Texas

Whereas, in conformity to House Bill No. 266, passed at the regular Session of the 44th Legislature of the state of Texas, the Commission after due notice has held hearings on or before the 20th day of each calendar month, including the hearing held at Austin, Texas, on September 19, 1935, with respect to the existence and imminence of waste of sweet and sour natural gas in the state of Texas, and the prevention thereof, and

From testimony introduced and witnesses heard at said hearings, the Commission makes the following findings of fact:

A. The purposes and intent of said House Bill No. 266 can be more effectively carried out by separating the Panhandle sweet gas field into two separate common reservoirs, one of which zones shall be known as the East Panhandle Field and the other of said zones shall be known as the West Panhandle Field. The point of division between said two fields shall be a line which runs due north and south through the Panhandle Field along the east line of Sections 8, 9 and 10 of Block 3, I&GN RR Survey, Gray County. This line extends southward through the field and through the city of Lefors and changes its course southwestward to the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward ap-

proximately through the east side of Sections 3, 4, 5 and [fol. 425] 6, straight southward through the remaining portion of the field. This line passes through the east line of Sections 2 and 3, Block "H", A. Wallace Survey, all in Gray County, Texas. The Commission finds that these two zones should be established on account of the following facts:

A low pressure area exists in Gray County which forms a physical reservior barrier between the two fields and makes the migration of gas impossible from either of said fields to the other. In addition to this reservoir condition, the pipe lines which withdraw gas from one of said fields do not now withdraw and have never withdrawn gas from the other of said fields and the lines of such companies do not extend into such other field.

B. Tests have been made by the Engineering Department of the Railroad Commission of Texas for the purpose of establishing a line of demarcation between the sweet and sour gas areas in the Panhandle Field: Where qualitative lead acetate tests showed that a trace of hydrogen sulphide was present in the gas issuing from these gas wells quantitative determinations were made, using the silver nitrate absorption method recommended by the U. S. Bureau of Mines in their Bulletin No. 560 for low concentration of hydrogen sulphide. This method was employed because it is quantitatively accurate and better than any of the methods generally employed for hydrogen sulphide determinations, indicating the true hydrogen sulphide content of the gas. As a result of these tests, it was found that there is a very sharp line of demarcation between the sweet [fol. 426] and sour gas areas in this field. This line of demarcation begins at the Southern edge of the approximate boundary of production of the Panhandle Gas Field at Section 19, Block 25, G&M Survey, Hartley County, and travels Northwest to Section 12, Block 2, G&M Survey, Hartley County, and it changes its course to a Northeasterly direction to Section 71, Block 44, H&TC Survey in Moore County; thence North to Section 319, Block 44, H&TC Ry Co. Survey in Moore County; thence extending in a Southeasterly direction across Hutchinson and Gray Counties to the Northern approximate boundary of production of the field at Section 88, Block 3, I&GN Survey in Gray County.

Those wells which produced oil were quite often found to contain hydrogen sulphide, even though they lay South of the line of demarcation established for the purely gas wells. Hence, separate tests had to be made on those high gas-oil ratio wells which lay South of the line separating the sweet and sour gas areas.

C. The aggregate lawful volume of open flow or daily potential capacity to produce sweet gas from both the West Panhandle sweet gas field and the East Panhandle sweet gas field is in excess of the daily reasonable market demand for such gas from such fields to be utilized for lawful purposes.

D. The aggregate lawful volume of open flow or daily potential capacity to produce sour gas from the West Panhandle sour gas field in excess of the daily reasonable market demand for such gas from such field to be utilized for lawful purposes. The Commission through its observations and tests have been unable to detect to date any [fol. 427] sour gas in the East Panhandle Field.

E. It is necessary to restrict the production of gas from wells capable of producing sweet and sour gas from each of said fields, to comply with the requirements of said House Bill No. 266. Physical waste, both underground and overground, is now taking place in each of said fields; and the restriction of production when ratably distributed among the various wells in said fields, capable of producing sweet and sour gas, will prevent physical waste as defined by said House Bill No. 266; will result in a greater ultimate recovery of gas from each of said fields; will result in a more efficient drainage from said reservoirs by the producing wells; and such restriction is necessary to protect and adjust the correlative rights and opportunities of the owners of the various wells in said fields capable of producing sweet and sour gas.

F. The efficient drainage area of a gas well in the East Panhandle field, producing at 25% of the daily producing capacity, is 160 acres. Acreage surrounding any well in excess of that amount, therefore, should not be taken into account in allocating the allowable production among the various wells located in said field.

The evidence introduced at the hearings did not satisfy the Commission that wells located in the West Panhandle Field as described in Paragraph A above, have an efficient drainage area substantially different from those located in the East Panhandle Field. The Commission does find, however, that on account of the lack of diverse fee and lease ownerships in said West Panhandle Field and the widely [fol. 428] spaced drilling program which has been followed in said field, it is equitable under present conditions to fix an acreage factor to be used in allocating allowable production among wells in said West Panhandle Field substantially larger than that which is fixed for the East Panhandle Field, and that no substantial inequities and injustices to operators in either of said fields will be occasioned by such acreage factor being adopted for the West Panhandle Field. For this reason, therefore, the Commission finds that the efficient drainage area of a gas well located in the West Panhandle Field, under present conditions, is 640 acres. This drainage is applicable to both the sour and sweet gas producing wells.

G. To accomplish the purposes set forth in Paragraph C hereof, the total production of all wells in each of said fields should be restricted to the reasonable market demand for lawful purposes for such gas from each of said fields, as found by the Commission.

For the month of October, 1935, or until otherwise ordered, the reasonable market demand for sweet gas for lawful purposes from the East Panhandle Field is found to be 95,000,000 cubic feet per day, computed at a pressure base of four ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method.

The reasonable market demand for sweet gas for lawful [fol. 429] purposes from the West Panhandle Field until otherwise ordered is found to be 380,000,000 cubic feet of gas per day, computed on the basis set forth in the preceding paragraph. The reasonable market demand for sour gas for lawful purposes for the West Panhandle Field until otherwise ordered is found to be 360,000,000 cubic

feet per day computed on the basis as set forth in the preceding paragraph.

It is necessary to restrict the daily amount of gas produced from oil wells in order that equal withdrawals from the reservoir might be accomplished. To do this, it is necessary for the Railroad Commission of Texas to establish a maximum gas-oil ratio for all oil wells in the Panhandle Field.

Therefore, it is Ordered by the Railroad Commission of Texas, that, effective October 1, 1935, no well producing both oil and gas shall be permitted to produce gas in excess of Ten Thousand (10,000) cubic feet per barrel of oil produced unless specially authorized by an order of the Railroad Commission to vary therefrom. The gas-oil ratio shall be the relationship of the total volume of gas in cubic feet to the total volume of oil in barrels, produced from any specific well. Any well which, by reason of its location or mode of completion, is producing with a gas-oil ratio in excess of that authorized by the Railroad Commission shall be allowed to produce daily a total volume of gas equivalent to that of any other well producing from the same common source within the limits set by the Commission. Wells producing with a gas-oil ratio in excess of 100,000 cubic feet per barrel of oil shall be termed as gas wells, and shall [fol. 430] be given a daily gas allowable comparable to other gas wells in the Panhandle Field.

It is Also Ordered by the Railroad Commission of Texas that the Panhandle Gas Field shall be divided into the East and West Panhandle Fields and the daily allowable for individual wells in the West Panhandle Field shall be determined by dividing the allowable for the West Panhandle Field into two (2) equal parts, and 50% of this allowable shall be distributed to each well in proportion to the relative producing ability of these individual wells, and 50% of the allowable shall be based on the number of acres containing each of these wells, and in no case shall more than 640 acres be allocated to any one well for the purpose of proration. The daily allowable for individual wells located in the East Panhandle Field shall be determined by dividing the allowable for the East Panhandle Field into two (2) equal parts, and 50% of this allowable shall be distributed to each well in proportion to the rela-

tive producing ability of these individual wells, and 50% of the allowable shall be based on the number of acres containing each of these wells, and in no case shall more than 160 acres be allocated to any individual well.

It is Also Ordered, that effective 7 a. m., October 1, 1935, the daily allowable sweet gas production for the West Panhandle Field shall be 380,000,000 cubic feet per day, computed at a pressure base of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according [fol. 431] to test made by the Balance Method, and the allowable for sweet gas in the East Panhandle Field shall be 95,000,000 cubic feet per day, computed at a pressure base of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's Law, and for specific gravity according to test made by the Balance Method; the allowable for sour gas in the West Panhandle Field shall be 360,000,000 cubic feet per day computed at a pressure base of four (4) ounces per square inch above the average barometric pressure of 14.4 pounds per square inch, a standard base and flowing temperature of sixty (60) degrees Fahrenheit, corrected for pressure according to Boyle's law, and for specific gravity according to test made by the Balance Method, and each well located in the East and West Panhandle Fields shall produce a daily amount of gas as reflected by the proration schedules compiled by the Railroad Commission of Texas, and attached hereto, and those schedules shall be available, either at the Railroad Commission office at Pampa, Texas or the Railroad Commission office at Austin, Texas.

New Wells.—Where any new well, capable of producing sweet or sour gas, is completed in either of said fields, such well until the next hearing of the Commission and the issuance of new allowables and schedules based thereon, shall be permitted to produce not in excess of 50,000 cubic feet of gas per day.

Schedules.—The Commission, through its Deputy Super- [fol. 432] visors in the field, will cause to be issued sched-

ules setting forth, among other things, the company owning the well, the well number, the name of the lease, the acres involved, the well potential, and the total daily allowable production in thousands of cubic feet of gas.

It is Further Ordered that this Docket be kept open to consider any claims of discrimination or hardship which might result by virtue of this order. The problem of carrying out the provisions of House Bill No. 266 is a complex and difficult one, especially in the enormous Panhandle field where there are so many diverse and conflicting interests and where the physical facts present so many complexities.

The Commission has made an intensive and comprehensive study of this field through its engineering staff and personal study and investigation. Its studies and investigations will be continued and as a result of its monthly hearings, as provided in the Statute, the Commission will be afforded the opportunity to and will promptly correct any injustices or inequalities that may be inherent in its current order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner, Lon A. Smith, Commissioner. (Seal.)

Attest: C. F. Petet, Secretary.

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25. Order of Railroad Commission

Railroad Commission of Texas

[fol. 433]

Oil and Gas Division

Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet and Sour Gas in the Panhandle District of Texas

Austin, Texas, December 10, 1935.

Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas

Whereas, in conformity to House Bill No. 266, passed at the Regular Session of the Forty-fourth Legislature of the state of Texas the Commission after due notice has held

public hearings on and before the twentieth (20th) day of each calendar month, including the hearing held in Austin, Texas, on November 19th to 21st, 1935, inclusive, with respect to the existence and imminence of waste of sweet and sour natural gas in the State of Texas, and prevention thereof, and

Whereas, from the records of the Commission and witnesses heard at the various hearings, and from intensive and comprehensive study of this field through its Engineering Staff, and from a personal study and investigation by the Commission, the Commission finds:

The Panhandle oil and gas field structure lies along a buried mountain range known geologically as the Amarillo Arch, that extends along the length of the field, continuing in a southeasterly course into the southwesterly portion of [fol. 434] Oklahoma, where it comes to the surface as the Wichita Mountains, at an elevation of approximately 1000 feet above sea level. The field is a belt lying in a southeasterly northwesterly direction and extends from eastern Wheeler County to northern Moore County, Texas. It is approximately 124 miles in length with an average width of approximately 20 miles, containing 1,504,386 acres; there being 1,066,662 acres of sweet gas, and 437,724 acres of sour gas territory. The field is located in the counties of Hartley, Moore, Hutchinson, Potter, Carson, Gray and Wheeler. The oil producing area covers a belt about 90 miles in length lying on the northeast flank of the structure.

The oil and gas so far encountered in the Panhandle Field has been found, with minor exceptions, in four separate strata, namely: the dolmite, the arkosic-dolmite, the gray limestone, and the granite wash. These four formations overlie one another, and though they are normally separated one from another by impervious strata, they are interconnected as is shown by the fact that the virgin pressure of the oil and gas from all of them was 430 pounds per square inch at sea level, regardless of the location in the field.

Gas was first discovered in northern Potter County, Texas, in December, 1918, and was encountered at a depth of 2,605 feet. The gas production for several years was developed only incidentally in the search for oil. The first important oil was discovered in 1925 and the major oil

pools were developed in 1926 and 1927. The development [fol. 435] of the gas field became prominent about 1926, and continued until 1929 when it was temporarily halted by the "depression." Since 1933, the gas field has been developed at a very rapid rate.

The oil wells in the oil pools in the field were, as a general rule, drilled through one or more gas-containing strata before entering the oil-containing stratum, and, in many instances, the wells were so completed as to cause production of gas from the gas strata along with the oil and gas from the oil stratum, with the result that tremendous quantities of gas have been produced with the oil, large portions of it coming from gas-producing strata above the oil-producing strata. This gas was in large part blown into the air, and it has been estimated that in excess of two trillion cubic feet of gas produced in this manner has been wasted into the air.

Coincident with the development of the Borger pool, casinghead gasoline plants were erected therein in which considerable portions of the gas produced therein were processed for the extraction of the gasoline content thereof, and, there being no market for the stripped gas, called "residue gas," resulting from the operations of said plants, the bulk of such residue gas was wasted into the air. In varying degrees, the same is true of the other oil pools as they were developed and operated.

The Panhandle Field is so far removed from centers of population and industrial activity that little value was at first placed upon the enormous quantities of gas therein found, but, due to the development of the casinghead gaso- [fol. 436] line plants and the resultant abundant supply of cheap residue gas that was being wasted into the air, the carbon black industry was attracted to the area, and in September, 1926, the first carbon black plant was completed. It was located in the Borger pool, and proceeded to burn considerable quantities of such residue gas for the manufacture of carbon black. Thirty additional carbon black plants have since been built and placed in operation in the field. The combined throughput capacity of said plants is approximately 570,000,000 cubic feet of gas daily. In excess of 70 per cent of the carbon black manufactured in the United States is being manufactured in the Panhandle Field.

There are, at the present time, 1090 natural gas wells in this field. These wells have a total daily open flow potential of 17,231,183 M. C. F. Of this total 225 wells produce sour gas and these wells have a total open flow potential of 2,099,985 M. C. F. daily. In the oil producing belt there are 2,527 oil wells producing from 27 different pools.

Development throughout the Panhandle Field has long since proved it to be the largest known reserve of natural gas in the United States. The demand for gas for light and fuel uses was local and was relatively small, prior to 1926.

The construction of pipe lines began in January, 1926, when the Northern Texas Utilities Company started transporting gas to towns in northern Texas, the principal one of which was Wichita Falls. In July of 1927, the Lone Star Gas Company started running gas in northern Texas, principally into Ft. Worth and Dallas. In the early part of 1928, the South Plains Pipe Line Company and the [fol. 437] Cities Service Gas Pipe Line Company started transporting gas from this field, the former into towns south of Amarillo in West Texas and the latter to Kansas City, Missouri. In June of that year, the Canadian River Gas Company began transporting gas into Colorado, principally into the cities of Denver and Pueblo. In November of that year, Texas Panhandle Gas Company began using its line to transport gas into Oklahoma and to Wichita, Kansas. There was relatively little development by pipe lines from this time until June of 1931, when the Panhandle Eastern Pipe Line Company began transporting gas through its line as far as Indianapolis, Indiana.

In October of 1931, the Texoma Natural Gas Company began its operations. The gas transported by this line was carried to markets in Nebraska, Iowa, and Illinois, the principal market being Chicago and its vicinity. In May of 1932, the Northern Natural Gas Company began its operations in which it transported gas into Nebraska and Iowa, principally into the towns of Des Moines, Iowa, and Minneapolis, and St. Paul, Minnesota.

The total length of these nine major pipe lines approximates 4,425 miles and the total capacity thereof is approximately 1,000,000,000 cubic feet of gas per day. A daily average of approximately 300,000,000 cubic feet of gas

was transported from the Panhandle Field through these lines during the year 1933 and a daily average of approxi-
[fol. 438] mately 400,000,000 cubic feet of gas was being transported through said lines during the year 1934; and the daily average amount being transported there through at the present time is approximately 450,000,000 cubic feet.

Those major pipe line companies acquired and now hold under lease approximately 850,000 acres of land, which is about 61 per cent of the total gas producing area in the Panhandle Field, each such company separately owning and operating its own leases. Of the total area proven productive of sweet gas, these major companies own approximately 80 per cent. They have not and are not taking or transporting sour gas through their lines. Unless such gas is treated, it is not suitable for light, fuel and domestic uses. The demand for sour gas for light and fuel uses is restricted to isolated lease purposes.

Six or seven of the major pipe line companies have produced and transported to the markets gas produced from only their own gas leases (or the leases of their respective affiliated or subsidiary companies), and have not purchased gas from other lease owners in the field. Prior to and since the passage of said Act, many of the unconnected lease-owners have repeatedly endeavored to induce those companies to purchase gas from their lands, but without avail. Some of these companies have been and are willing to purchase gas ratably in the field, if all the others would do so, and two companies, have made thirty (30) new connections and are taking ratably from these connections.

In addition to the major pipe lines there are ten additional pipe lines of lesser capacities serving local towns
[fol. 439] and cities in the immediate vicinity of the field with a throughput capacity of approximately only 65,000,000 cubic feet of gas per day. For the most part, these small pipe line companies own their own leases and supply their requirements therefrom, although some of them purchase some of their requirements from other lease owners. Nevertheless, a very large number of separately owned leases have remained without connections with market outlets. In fact, there are more than 90 gas wells that have never had a connection. The pipe line companies, large and small, have taken up all the markets economically and

practically available for sweet gas from the Panhandle Field, and their control thereof constitutes a virtual, if not an actual, monopoly of said markets.

The policy of most of the pipe line companies operating in this field to take gas from only those wells which they owned, to the exclusion of the other operators in the field has resulted in a protracted controversy between them and those operators in this field without a market. This controversy resulted in the passage by the Legislature of the state of Texas of a number of bills, all of which had as their purpose the protection of the right of those operators to sell their gas. In 1931, the Forty-second Legislature passed what is known as the Common Purchaser Act. This law required that pipe line companies taking gas in the state should be considered as a common purchaser and should take gas ratably under conditions which should be prescribed by the Railroad Commission of Texas. As a re- [fol. 440] sult of this Act, the Railroad Commission issued orders which had the effect of requiring the distribution of the markets of the pipe line companies among the various producers in the field in proportion to the daily open-flow potentials of the wells owned by these producers. This law was attacked by several of the gas pipe line companies in the United States District Court for the Western District of Texas and the Statute and the Orders of the Railroad Commission issued thereunder were stricken down.

As a result of the failure of the Common Purchaser Act, the Second Called Session of the Forty-second Legislature passed an Act which provided that the Railroad Commission should determine the market demand for any particular field and should allocate the production in this field among the various producers to meet this market demand. The Orders entered by the Railroad Commission as a result of this Act were again attacked by the same pipe line companies in the United States District Court for the Western District of Texas and were stricken down.

As a result of the failure of these Legislative attempts to obtain ratable production, there was passed by the First Called Session of the Forty-third Legislature a bill known as the Stripping Law or the Sour Gas Bill. This bill, in effect, gave to the Railroad Commission the power to permit the use of natural gas for any beneficial purpose.

Before the passage of this bill, it had been the policy of the Railroad Commission to permit the use of casinghead gas only in stripping operations, but after its passage, the Railroad Commission began issuing permits to strip dry natural gas. As a result of the issuing of these permits, a number of gasoline plants were built and began to operate in the field.

[fol. 441] During the fall of 1933 and the year of 1934, five gasoline extraction plants were built and began operation. In addition, most of the gasoline plants which had been operating entirely on casinghead gas were converted into stripping plants. As a result of these developments, by the fall of 1934, in excess of one billion cubic feet of gas was being blown into the air daily. These operations so rapidly depleted the gas field that it soon became evident that some other solution of the problem must be obtained. Hence, in the spring of 1935, the Forty-fourth Legislature passed a comprehensive conservation Statute known as House Bill No. 266, the purpose of which was to prevent waste and compel ratable production. Section 10 of this Bill states:

"It shall be the duty of the Commission to prorate and regulate the daily gas well production from each common reservoir in the manner and method herein set forth. The Commission shall prorate and regulate such production for the protection of public and private interests.

"(a) In the prevention of waste as "waste" is defined herein.

"(b) In the adjustment of correlative rights and opportunities of each owner of gas in a common reservoir to produce and use or sell such gas as permitted in this article."

The "waste" referred to above is defined in Section 3, of House Bill No. 266, to specifically include:

(a) The operation of any oil well, or wells, with an in-[fol. 442] efficient gas-oil ratio.

(b) The drowning with water of any stratum or part thereof capable of producing gas in paying quantities.

(c) Underground waste or loss however caused and whether or not defined in other subdivisions hereof.

(d) Permitting any natural gas well to burn wastefully.

(e) The creation of unnecessary fire hazards.

(f) Physical waste or loss incident to, or resulting from, so drilling, equipping, or operating well or wells as to reduce or tend to reduce the ultimate recovery of natural gas from any pool.

(g) The escape into the open air, from a well producing both oil and gas, of natural gas in excess of the amount which is necessary in the efficient drilling or operation of the well.

(h) The production of natural gas in excess of transportation or market facilities, or reasonable market demand for the type of gas produced.

(i) The use of natural gas for the manufacture of carbon black without first having extracted the natural gasoline content from such gas.

(j) The use of sweet gas produced from a gas well for the manufacture of carbon black.

(k) Permitting any natural gas produced from a gas well to escape into the air before or after such gas has been processed for its gasoline content.

(l) The production of natural gas from a well producing [fol. 443] oil from a stratum other than that in which the oil is found, unless such gas is produced in a separate string of casing from that in which the oil is produced.

(m) The production of more than one hundred thousand (100,000) cubic feet of gas to each barrel of crude petroleum oil unless such gas is put to one or more of the uses authorized for the type of such gas so produced under allocations made by the Commission.

Whereas, from testimony adduced at hearings heretofore mentioned, the Commission finds that:

1. Unless the withdrawals from a common reservoir are restricted and distributed uniformly, waste will result from one or a combination of the following conditions:

(a) Water channeling and coning.

(b) Loss of energy by permitting unnecessary subsurface expansion of gas without doing useful work.

(c) Failure to recover the greatest ultimate quantity of gas.

(d) Dissipation of gas energy in areas adjacent to oil-bearing sands in the same common reservoir.

2. In order to approach uniform withdrawals from a common reservoir, the gas must be taken ratably with respect to market demand.

3. If there is ratable taking of gas from a common reservoir based on a reasonable market demand for such gas, correlative rights and opportunities of the owners of gas wells in such reservoir will be substantially in adjustment; [fol. 444] and disproportionate withdrawals on the part of any operator will be prevented.

Elaborating on the above findings as they apply to the Panhandle Field, from testimony adduced at hearings and from a study by its Engineering Staff, the Commission finds that:

(a) Evidence was offered to show that petroleum oil and natural gas originated from the distillation of organic matter deposited in sedimentary rocks laid down under water conditions; that after the distillation of the organic materials into oil and gas, the water, oil and gas segregated in porous strata started arranging themselves in accordance with their densities; that due to the buoyant force caused by the different specific gravities of water, oil and gas, the lighter oil and gas migrated upward in the water containing porous strata, interbedded between impervious strata. As the oil migrated upward it became entrapped in structures, after displacing the water contained therein during the process of accumulation. Because of the inclination of the water filled porous strata, interbedded between impervious strata, the oil and gas deposits were accumulated under hydrostatic pressure.

Water contained in the same strata or zone which is adjacent to an oil or gas deposit is called "edge water," and the force that this water imparts to the oil or gas deposit is called "water drive." In the various fields in Texas, edge water imparts a force from a few hundred pounds per

square inch in some fields up to pressures in excess of 2500 [fol. 445] pounds per square inch in other fields. Where the volumetric withdrawals from a reservoir is greater than the encroachment of the edge water, the pressure of the reservoir decreases proportionately. Unless the edge water pressure or water drive is substantially controlled by uniform withdrawals from a common reservoir, water channeling and water coning will result, and have resulted, in the trapping of oil and gas deposits which may never be recovered, thereby causing underground waste.

The oil and gas in the Panhandle Field is under a hydrostatic water drive pressure, and the water adjacent to the oil and gas has a nearly constant composition. In the initial stages of development of the field the water pressure imparted to the oil and gas body a pressure of 430 pounds per square inch. But since the volumetric amounts of oil and gas withdrawals in certain parts of the field have greatly exceeded the ability of the water to encroach, this condition has developed low-pressure areas in regions of greatest withdrawals. The rapid withdrawals in various parts of the field have caused an irregular uneven encroachment of the water, resulting in water channeling and water coning in several places, thereby creating conditions of waste. The testimony shows that there are a number of oil and gas wells in this field which were formerly free from water, and which are now producing water in varying amounts.

(b) Natural gas differs from most other mineral resources in that it is used largely as a source of energy, and when used as such, has no other value except a source of energy. The energy which natural gas possesses and which [fol. 446] is available for use is of two kinds: First, the heat energy released on the combustion of the gas; and second, the work energy which may be produced on expansion of the gas. The latter type of energy is dependent not only upon the quantity of but also upon its pressure. Conservation of this type of energy is important when the pressure in the gas reservoir is below the maximum pressure which can be maintained in the pipe lines. Waste of this energy will occur by any method of production which delivers the gas at the surface at less than the maximum possible pressure. The most economical method of producing gas from this point of view is that method which produces the gas at the highest pressure. Conversely, the most

wasteful method is that method which produces the gas at the lowest pressure.

When gas is withdrawn rapidly from a gas reservoir there is formed around the well a region of high pressure gradient. The magnitude of this pressure gradient will depend upon the velocity of the gas, and upon the thickness and permeability of the sand. The greater the velocity of the gas the thinner and less permeable the sand the lower will be the pressure at which the gas is delivered into the well. As rapid withdrawal from the well is continued the region of low pressure spreads out from the well until a relatively large area around the well bore will be at a low pressure. This secondary effect is dependent not only upon the rate of withdrawal from an individual well, but also the number of wells withdrawing from a particular concentrated region in the reservoir. Both of these effects are increased by unequal or non-ratable withdrawals from the gas reservoir, and in either case there will be a loss of [fol. 447] the work energy of the gas because the gas will be delivered into the line at lower than the highest possible pressure.

The Commission finds from a study made by its Engineering Department that the irregular and non-ratable withdrawals which have occurred in this field in the past have already created low pressure areas, and the expenditure of considerable quantities of gas is required to replace the work energy lost when this gas is thus produced at less than the maximum pressure.

(c) When a gas field has been incompletely or irregularly developed and gas is accordingly taken from comparatively few wells, the pressure at those wells will be reduced so low that the wells will have to be abandoned while a considerable quantity of gas still remains in the reservoir. The pressure of this residual gas, however, will usually be so small that there will be no inducement to drill additional wells in the reservoir to recover it, and it will be irretrievably lost.

The Commission finds that in the Panhandle Gas Field, particularly in the western portions of this field, there are large areas which do not at the present time contain any gas wells. If the present system of non-ratable withdrawals from this field is permitted, a greater portion of this un-

drilled area will probably never be developed, with a consequent loss in the total amount of recoverable gas.

(d) Where a gas-bearing stratum also contains oil, con- [fol. 448] trol of the withdrawals from a gas-bearing stratum is usually of particular importance; first, because of the gas energy necessary to deliver the oil in the oil-bearing stratum into the oil wells; and, second, because if the pressure in the gas-bearing sands is reduced below that in the oil-bearing sand migration from the oil-bearing sand into the gas-bearing sand will occur and a large quantity of the oil used to saturate the heretofore dry sands can never be recovered. To prevent these wastes of oil, it is important to control the rates of withdrawal from the gas-bearing strata both as to the whole and as to the particular regions in the field.

In order to approach uniform withdrawals from the Panhandle Field, the gas must be taken ratably with respect to the reasonable market demand. In establishing ratable production, it is necessary for the Commission, first, to determine an efficient drainage area, and second, to devise a fair and uniform system of proration to be applied to the field. The Commission finds that these purposes can be more effectively carried out by separating the Panhandle Sweet Gas Field into two separate common reservoirs, one of which zones shall be *the* known as the East Panhandle Field, and the other of said zones shall be known as the West Panhandle Field. The point of division between said two fields shall be a line which runs due north and south through the Panhandle Field along the east line of Sections 8, 9, and 10, of Block 3, I & G N RR Survey, Gray County. This line extends southward through the field and through the city of LeFors and changes its course southwestward to [fol. 449] the northwest corner of Section 6, Alexander Crane Survey, Block 1, and from that point southward approximately through the east side of Sections 3, 4, 5, and 6, straight southward through the remaining portion of the field. This line passes through the east line of Sections 2, and 3, Block "H" A. Wallace Survey, all in Gray County, Texas.

The Commission finds that these two zones should be established because of an intervening structural restriction which does not permit the free intermingling of gas and the corresponding equalization of pressures between fields.

This structural restriction results from a down-faulted block occuring south of an eastwest fault, which roughly coincides with the north boundary line of the A. C. H. & B Survey, Block 1, Gray County for approximately ten (10) miles. Along the south side of this fault the corresponding pay horizons have been faulted down below the water level. The 25 or 30 wells which have been drilled south of this fault have either encountered water, or oil and gas in non-commercial quantities, thus showing there cannot be free intermingling of gas south of the fault from one field to the other. North of the fault the area has been drilled for oil to a density of approximately one well to each ten (10) acres. As a result of the heavy withdrawals from these oil wells their reservoir pressures have declined to a relatively low pressure per square inch along this narrow strip. Accordingly, this low pressure area north of the fault acts as a barrier against migration of gas from one field to the other.

The Commission has had tests carried out by its Engineering Department for the purpose of establishing a line of demarcation between the sweet and sour gas areas in the Panhandle Field. As a result of these tests it was found that this line of demarcation was very sharp, in that most of the wells in this field contained either a little or no hydrogen sulfide, or a high concentration of hydrogen sulfide. The line of demarcation thus established begins at the [fol. 450] southern edge of the approximate boundary of production of the Panhandle Gas Field at Section 19, Block 25, G & M Survey, Hartley County, and travels northwest to Section 12, Block 2, G & M Survey, Hartley County, changes its course to the northeasterly direction to Section 71, Block 44, H&TC Survey in Moore County; thence, north to Section 319, Block 44, H&TC Survey in Moore County where it changes to a southeasterly direction across Hutchinson, Carson and Gray Counties, to the northern approximate boundary of production of the field, Section 88, Block 3, I&GN Survey in Gray County. Those wells which produced oil were quite frequently found to contain hydrogen sulfide even though they lay south of the line of demarcation established for the dry gas wells; hence, separate tests had to be made on those high gas-oil ratio wells which lay south of the line separating the sweet and sour gas areas.

The Commission finds that the efficient drainage area of a gas well in the East Panhandle Field, producing at twenty five (25%) per cent of the daily producing capacity, is one hundred and sixty (160) acres. Acreage surrounding any well in excess of that amount, therefore, should not be taken into account in allocating the allowable production among the various wells located in said field.

The evidence introduced at the hearings did not satisfy the Commission that wells located in the West Panhandle Field have an efficient drainage area substantially different from those located in the East Panhandle Field. The Commission does find, however, that on account of the lack of diverse fee and lease ownerships in said West Panhandle [fol. 451] Field and the widely spaced drilling program which has been followed in said field, it is equitable under present conditions to fix an acreage factor to be used in allocating allowable production among wells in said West Panhandle Field substantially larger than that which is fixed for the East Panhandle Field, and that no substantial inequities and injustices to operators in either of said fields will be occasioned by such acreage factor being adopted for the West Panhandle Field. For this reason, therefore, the Commission finds that the efficient drainage area of a gas well located in the West Panhandle Field, under present conditions, is six hundred forty (640) acres. This drainage area is applicable to both the sour and sweet gas producing wells.

The Legislature, in setting up the method to be followed by the Commission in fixing the daily allowable production for each gas well in a common reservoir says that it shall take into consideration "The size of the tract segregated with respect to surface position and common ownership upon which such a gas well or wells are located; the relation between the daily producing capacity of each gas well and the aggregate capacity of all the gas wells producing the same kind of gas in the same common reservoir or zone; and all other factors which are pertinent."

Various formulæ have been suggested to the Commission of prorating gas in the Panhandle Field, and among these are:

(a) The ratio of the acreage on which any well is located, to the sum of the acreages of the various producing units in any field. (A)

[fol. 452] (b) The ratio of the daily producing capacity of each gas well to the sum of the daily producing capacities of all the gas wells in the field. (P)

(c) The ratio of the product of the daily producing capacity of the well and the acreage upon which it is located to the sum of the products of the daily producing capacity of all the wells in the field and the acreages of the tracts upon which they are located. (AXP.)

(d) Fifty (50%) per cent of the field outlet to be allocated on the ratio of the individual well acreage to the sum of the total well acreages in the field; and fifty (50%) per cent of the ratio of the individual well potential to the sum of the total field potential.

(e) Seventy-five (75%) per cent of the field outlet to be allocated on the ratio of the individual well acreage to the sum of the total well acreages in the field; and twenty-five (25%) per cent upon the ratio of the individual well potential to the sum of the total field potential.

(f) Ninety (90%) of the field outlet to be allocated on the ratio of the individual well acreage to the sum of the total well acreages in the field; and ten (10%) per cent upon the ratio of the individual well potential to the sum of the total field potential.

It is the opinion of the Commission that it cannot use the formulæ (a), (b), and (c), listed above, because formulæ [fol. 453] (a) and (c) do not take into consideration the relationship between the daily producing capacity of each gas well and the aggregate daily producing capacity of all gas wells producing the same kind of gas from the same reservoir, and (b) does not take into consideration the size of the tract upon which the well is located.

All of the formulæ listed above have been given due consideration and study by the Commission, and the Commission has concluded that in the Panhandle Gas Field a formula which distributes fifty (50%) per cent of the market demand in proportion to the ratio of the daily open flow capacity of each well to the aggregate daily capacity of all the wells producing the same kind of gas in the same reservoir and fifty (50%) per cent of the market demand in proportion to the ratio of the acreage of the tract upon which each well is located to the sum of the acreages upon which the

wells are located provided that no acreage shall be considered in excess of the above described efficient drainage areas will best accomplish the purposes for which proration was designed; that is, to prevent physical waste and to protect the correlative rights of the owners of gas wells in the field.

The aggregate lawful volume of open flow or daily potential capacity to produce sweet gas from both the West Panhandle Sweet Gas Field and the East Panhandle Sweet Gas Field is in excess of the daily reasonable market demand for such gas from such fields to be utilized for lawful purposes.

The aggregate lawful volume of open flow or daily potential capacity to produce sour gas from the West Panhandle [fol. 454] Sour Gas Field is in excess of the daily reasonable market demand for such gas from such field to be utilized for lawful purposes. The Commission through its observations and tests have been unable to detect to date any sour gas in the East Panhandle Field.

The Commission finds that the reasonable lawful market demand for the East Panhandle Sweet Gas Field for the month of December and until otherwise ordered will be 181,174,000 cubic feet daily; the reasonable lawful market demand for the West Panhandle Sweet Gas Field for this period will be 608,552,000 cubic feet daily; the reasonable lawful market demand for the Sour Gas Field will be 451,137,000 cubic feet daily.

The Commission finds that the daily open-flow capacity, or relative ability to produce gas, of the wells in the above mentioned fields and zones to be in excess of the reasonable market demand; being as follows: East Panhandle Sweet Gas Field 6,727,629 cubic feet; West Panhandle Sweet Gas Field 7,613,843 cubic feet, and for the Sour Gas Field, 1,648,848 cubic feet. (All in terms of M. C. F.)

Therefore, it is Ordered, that effective December 11, 1935, the gas-oil ratio of each well in the field shall be kept as low as possible, and no well producing both oil and gas shall be permitted to produce gas in excess of 10,000 cubic feet per barrel of oil produced unless specially authorized by an order of the Commission to vary therefrom. However, any well which by reason of its location, mode of completion, or necessity for total fluid lift, shall be allowed to [fol. 455] produce daily a total volume of gas equivalent to that of any other well producing from the Panhandle Field

proper, so long as the ratio of gas to oil does not exceed that set by Statute. A gas-oil ratio determination shall be made on each well at the time of completion, and at the time of retest. Each operator shall furnish to the Commission's Deputy Supervisor at Pampa, Texas, a gas measurement to determine the gas-oil ratio thereof, on each of his wells, on forms furnished by the Supervisor, at least each ninety (90) days period, the beginning and ending of said period to be set by the Supervisor. The Supervisor shall furnish to the Commission, through its Engineering Department, a detailed report at the end of each period, to enable the Commission to restrict or increase the daily amount of gas production from oil wells in order that uniformity of withdrawals from the reservoir may be approached, and that lifting energy may be conserved. The Commission, therefore, reserves to itself the right to grant exceptions, after a hearing from their application in individual cases, and to fix gas-oil ratios, at either a lower or a higher proportion than is provided for herein, as to individual wells and as to individual leases and/or properties, as rapidly as the facts can be determined upon which to act, in order that the possibility of such physical waste as might reasonably be expected to result from the continuance of any improper gas-oil ratio that might exist or that might come into being may be prevented in an adequate manner.

It is Ordered, that the Panhandle Gas Field shall be [fol. 456] divided into an East and West Panhandle Field, and that the West Field shall be divided into a sweet and sour zone. The point of division between the East and West Fields shall be a line which runs due north and south through the Panhandle Field along the east line of Sections 8, 9 and 10, of Block 3, I&GN Survey, Gray County. The line to extend southward through the city of LeFors and change its course southwestward to the northwest corner of Section 6, A&C Survey, Block 1, and from that point southward approximately through the east side of Section- 3, 4, 5, and 6, southward through the remaining portion of the field. This division to be flexible enough to work no hardships on any offset wells or properties. The West Field to be divided into a sweet and sour zone beginning at the southern edge of the approximate boundary of production of the Panhandle Field at Section 19, Block 25, G&M Survey, Hartley County, and traveling northwest to Section 12, Block 2.

G&M Survey, Hartley County, and it changes its course to a northeasterly direction to Section 71, Block 44, H&TC Survey, Moore County; thence north to Section 319, Block 44, H&TC Survey in Moore County; thence extending in a southeasterly direction across Hutchinson and Gray Counties to the northern approximate boundary of production of the field at Section 88, Block 33, I&GN Survey in Gray County. That portion of the field being on the north side of that line shall be the Sour Zone. Tests will be continually carried on by the Engineering Department under the supervision of a Chemical Engineer and using the latest approved method of testing, for the purpose of checking the line of demarcation between the sweet and sour zones of the field.

[fol. 457] It is Ordered, that the reasonable lawful market demand for the East and West Panhandle Fields, and the sweet and sour zones shall be determined by nominations for the purchase or use of sweet or sour natural gas submitted to the Commission in affidavit form; the form to be furnished by the Commission. However, the Commission will at the end of each ninety (90) days, beginning December 11, 1935, reconcile the nominations with records kept by the Commission and determine the reasonableness of the demand, making the necessary rectification in the daily allowable gas production for the field and zones. At such times the Commission will also make adjustment for accumulating individual well allowables and for emergencies as provided for in Section 18 of House Bill No. 266.

It is Ordered, That, effective 7 o'clock a. m., December 11, 1935, the daily allowable gas production, computed on the basis set forth in House Bill No. 266, is as follows:

East Panhandle Field, 181,174,000 cubic feet daily.
West Sweet Panhandle Field, 608,552,000 cubic feet daily.
West Sour Panhandle Field, 451,137,000 cubic feet daily.

It is Ordered, That the daily allowable production of gas for individual wells in the East and West Panhandle Fields shall be determined by dividing the reasonable market demand into two parts, and that these parts shall be distributed to each well in proportion to the relative producing ability of these individual wells and the number of acres containing each of these wells, but in no case shall more than one hundred sixty (160) acres in the East Pan-
[fol. 458] handle Field and not more than Six Hundred

Forty (640) acres in the West Panhandle Field, in both sweet and sour zones, be allocated to any one well for the purpose of proration.

It is Ordered, That the total daily allowable production of gas from gas wells in the East and West Panhandle Fields shall be distributed and prorated among the individual wells on the following basis and in the following manner, to-wit:

Fifty (50%) per cent of the reasonable market demand of the field shall be allocated on the ratio of the individual well acreage to the sum of the total well acreage in the field; and fifty (50%) per cent of the reasonable market demand of the field shall be allocated on the ratio of the individual well potential to the sum of the total well potentials in the field.

It is Ordered, That the Commission will cause to be issued schedules setting forth, among other things, the company owning the individual well, the name of the lease, the well number, and the proven contiguous well acreage, the open-flow capacity, and the total daily allowable production in thousands of cubic feet. The Commission hereby directs all purchasers, well owners and operators, to notify the Commission within fifteen (15) days after receiving a copy of the schedule of any typographical errors or differences of any kind between the matters set forth and the records of the purchasers, well owner, and operators.

It is Ordered, That each purchaser, pipe line company or gasoline plant operator taking gas from wells classified as gas wells by the Commission shall prepare a monthly re- [fol. 459] port upon forms furnished by the Commission (Form 3-266 A & B) according to instructions contained within the report. Among other things, said report shall contain the proven contiguous acreage under lease or contract on which the gas well is located, up to the maximum number of acres in the specified drainage area for the field.

It is Ordered, That whenever natural gas in commercial quantities, in a well defined gas-bearing stratum known to contain natural gas in such quantities is encountered in any well drilled for oil or gas, such gas shall be confined in its original stratum until such time as the same can be produced and utilized without waste, and all such strata shall be adequately protected from infiltrating water. The drowning with water of any stratum or part thereof capable of producing gas is strictly forbidden.

It is Ordered, That where any new well is completed after issuance of schedules under this Order, or reconditioned well, or oil well plugged back and made a gas well, or any oil well exceeding the displacement gas allowance, or any oil well exceeding the specified gas-oil ratio and classed as a gas well, or a well that has been without a pipe line connection, capable of producing sweet or sour gas, such well until the next hearing of the Commission and the issuance of new allowables and schedules based thereon, shall be permitted to produce not in excess of 50,000 cubic feet of gas per day; provided the gas is to be utilized for purposes and uses authorized by law and the orders of the Commission. All gas wells shall be closed in until such time as such natural gas shall be utilized for purposes and uses authorized by law and the orders of the Commission. The Commission, however, will accept open-flow capacity tests, on the wells mentioned above, that are witnessed by the [fol. 460] potential purchaser of the gas and the offset operator or by the well owner and the offset operator, between the semi-annual testing dates, July and January, but any discrepancy in test results found at the official test will be retroactive.

It is Ordered, That no gas shall be allowed to burn wastefully nor will the creation of fire hazards be allowed.

It is Ordered, That the rules of the Commission pertaining to the prevention of physical waste or loss incident to, or resulting from the drilling, equipping, or operating of a well or wells as to reduce or tend to reduce the ultimate recovery of natural gas from any pool, must be adhered to.

It is Ordered, That the escape into the open air, from a well producing both oil and gas, of natural gas in excess of the amount that is necessary in the efficient drilling or operation of the well is strictly forbidden, and shall be governed by rules of the Commission.

It is Ordered, That the production of natural gas in excess of transportation or market facilities, or reasonable market demand for the type of gas produced shall not be permitted, and is to be controlled by the Commission's determination of the reasonable market demand and the issuance of proration schedules.

It is Ordered, that the use of natural gas for the manufacture of carbon black without first having extracted the natural gasoline content from such gas, and that the use of

sweet gas produced from a gas well for the manufacture of carbon black shall in no case be permitted.

[fol. 461] It is Ordered, That no sour natural gas shall be used for the manufacture of carbon black in any plant which produces less than one pound of carbon black per thousand cubic feet of gas.

It is Ordered, That no natural gas produced from a gas well shall be allowed to escape into the air before or after such gas has been processed for its gasoline content.

It is Ordered, That no gas well or oil well shall be permitted to produce gas from different levels, sands, or strata at the same time through the same string of casing, and that if the Commission believes this to be happening in any case, the Deputy Supervisor is hereby authorized to make gas-oil ratio, bottom-hole pressure, charcoal test of the gas for its gasoline content, specific gravity determination of gas, analysis of the gas, a study of the well log, and any other tests at any time for the purpose of comparing the gas with gas from offset property, or tests pertinent to the information desired, and the owner of such well is hereby directed to do all things that may be required of him by the Commission's Agent to properly make such test.

It is Further Ordered, That this docket be kept open for the introduction of further evidence or information so that the Commission may, at any time, modify or amend this order or enter such other or further general or special order or orders as may be necessary to correct or relieve any inequalities, injustices or inequities that may result from the enforcement of the provisions of this order.

[fol. 462] Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner; Lon A. Smith, Commissioner. (Seal.)

Attest: C. F. Petit, Secretary.

26. Order of Railroad Commission

Railroad Commission of Texas

Oil and Gas Division

Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet and Sour Gas in the Panhandle District of Texas

Austin, Texas, December 18, 1935

Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas for the Month of January 1936

The Commission, after due notice as required by the Statutes of Texas, held a public hearing on December 16th and 17th, 1935, at Austin, Texas, relating to the proration and regulation for the month of January, 1936, of the production of sweet and sour gas in the state of Texas, in accordance with the provisions of House Bill No. 266, passed by the Forty-fourth Legislature of Texas (1935), and thereat [fol. 463] the Commission received and heard evidence and gave all parties an opportunity to be heard.

From the evidence introduced at said hearing, together with that which was received by the Commission at previous hearings involving the Panhandle gas field and which was re-introduced and considered as a part of the evidence at the said hearing on December 16th and 17th, 1935, the Commission finds and determines as follows:

First. That the proration order of the Commission dated December 10, 1935, entitled "Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas" should be now and hereafter regarded as The Basic Order relating to the proration of sour and sweet gas in the Panhandle district.

Second. That, except as hereinafter otherwise found, the findings of fact contained and set forth in the said Basic Order are approved and adopted as the findings of fact as a basis for this order for the month of January, 1936, for that the Commission finds that said findings are supported by the evidence received and considered at the said hearing held December 16th and 17th, 1935.

Third. That the combined open-flow capacities, that is, the aggregate daily capacity to produce, of the gas wells in the East Panhandle Sweet Gas Feld is 6,938,169,000 cubic feet per day; the West Panhandle Sweet Gas Feld is 8,-
[fol. 464] 324,321,000 cubic feet per day; and the Panhandle Sour Gas Field is 2,128,328,000 cubic feet per day.

Fourth. That the reasonable market demand for sweet gas for uses permitted by House Bill No. 266, during the month of January, 1936, in the East Panhandle Sweet Gas Field is 181,174,000 cubic feet per day; and in the West Panhandle Sweet Gas Field is 608,552,000 cubic feet per day; and for sour gas in the Panhandle Sour Gas Field is 520,496,000 cubic feet per day; and said amounts respectively, are the amounts that will be produced from said zones, respectively, during said month to be utilized as permitted by said Act.

It is Therefore Ordered that, except as hereinafter otherwise ordered, all of the provisions, directions, rules, regulations and orders set forth and contained in the said Basic Order relating to the Panhandle Gas Field and the different zones thereof be and the same are hereby adopted and re-promulgated and continued in force and effect for and during the month of January, 1936, and that same shall continue thereafter in force and effect until otherwise ordered by the Commission.

It is Further Ordered that the daily allowable gas production computed on the basis set forth in House Bill No. 266, in said zones, respectively, for and during the month of January, 1936, and thereafter until ordered by the Commission, shall be as follows:

East Panhandle Sweet Gas Field, 181,174,000 cubic feet per day;

West Panhandle Sweet Gas Field, 608,552,000 cubic feet per day;

Panhandle Sour Gas Field, 520,496,000 cubic feet per day;

[fol. 465] and same shall be allocated and prorated among the gas wells in said zones respectively, on the basis directed and ordered in said Basic Order; and the amount of gas each well is allowed to produce daily, in accordance herewith, shall constitute its daily allowable production, but no well shall in any event be permitted to produce in excess of 25

per cent of its open-flow capacity. Schedules shall be prepared and available to all gas-well owners accordingly.

It is Further Ordered that this Docket be kept open to consider any claims of discrimination or hardship, and to offer administrative relief, if possible, for any hardship which might result by virtue of this Order, and that the Commission is anxious to hear at public hearing, in accordance to law, evidence as to any peculiarities as to any or all of the gas fields or reservoirs and/or gas wells affected by this Order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner. (Seal.)

Attest: C. F. Petet, Secretary.

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27. Order of Railroad Commission

Railroad Commission of Texas

Oil and Gas Division

[fol. 466] Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet and Sour Natural Gas in the Panhandle District of Texas

Austin, Texas, January 18, 1936.

Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas for the Month of February, 1936

The Commission, after due notice as required by the Statutes of Texas, held a public hearing on January 16th, 1936, at Austin, Texas, relating to the proration and regulation for the month of February, 1936, of the production of sweet and sour natural gas in the state of Texas, in accordance with the provisions of House Bill No. 266, passed by the Forty-fourth Legislature of Texas (1935), and thereat the Commission received and heard evidence and gave all parties an opportunity to be heard.

From the evidence introduced at said hearing, together with that which was received by the Commission at previous

hearings involving the Panhandle Gas Field and which was re-introduced and considered as a part of the evidence at the said hearing on January 16th, 1936, the Commission finds and determines as follows:

First. That the proration order of the Commission dated December 10, 1935, entitled "Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas," should be now and hereafter regarded as The Basic Order relating to the proration of [fol. 467] sour and sweet gas in the Panhandle District.

Second. That, except as hereinafter otherwise found, the findings of fact contained and set forth in said Basic Order are approved and adopted as the findings of fact which will serve as a basis for this order for the month of February, 1936, in that the Commission finds that said findings are supported by the evidence received and considered at the said hearing held December 16th and 17th, 1935, and January 16th, 1936, and from intensive and comprehensive study of these fields through its Engineering Staff, and from a personal study and investigation by the Commission.

Third. That the combined open-flow capacities, that is, the aggregate daily capacity to produce, of the gas wells in the East Panhandle Sweet Gas Field containing 355 gas wells is 7,012,940,000 cubic feet per day; the West Panhandle Sweet Gas Field containing 522 gas wells is 8,506,630,000 cubic feet per day; and, the Panhandle Sour Gas Field containing 243 gas wells is 2,524,617,000 cubic feet per day.

Fourth. That the reasonable market demand for sweet gas for uses permitted by House Bill No. 266, during the month of February, 1936, in the East Panhandle Sweet Gas Field is 199,045,000 cubic feet per day; and in the West Panhandle Sweet Gas Field is 625,803,000 cubic feet per day; and for sour gas in the Panhandle Sour Gas Field is 487,705,000 cubic feet per day; and said amounts respectively, are the amounts that will be produced from said zones, with the exception of the Panhandle Sour Gas Field, [fol. 468] during said month to be utilized as permitted by said Act.

Fifth. That it is necessary to limit the production of dry sour natural gas to fifteen per cent (15%) of the total

potential of the Sour Gas Area, in order to arrest the migration of dry sweet natural gas into the Sour Gas Area. That to thus limit the production of dry sour natural gas to fifteen per cent (15%) of the total potential of the sour gas area will tend to prevent waste caused by the co mingling of dry sweet and sour natural gas. That the available casinghead gas is more than adequate to supply the additional gas demanded for uses to which dry sour natural gas may legally be put.

Sixth. That the Commission, in keeping with its policy, established on the basis of evidence introduced at the State-wide Hearing on September 19th, 1935, of progressively lowering the maximum gas-oil ratio in the Panhandle District until the most efficient ratio is reached, finds, that it is necessary to further restrict the daily volume of gas produced from oil wells in order that uniformity of withdrawals from the reservoir may be more nearly approached.

It is Therefore Ordered that, except as hereinafter otherwise ordered, all of the provisions, directions, rules, regulations and orders set forth and contained in the said Basic Order relating to the Panhandle Gas Field and the different zones thereof be and the same are hereby adopted and repromulgated and continued in force and effect for and during the month of February, 1936, and that same shall continue thereafter in force and effect until otherwise ordered by the [fol. 469] Commission.

It is Further Ordered that the daily allowable gas production computed on the basis set forth in House Bill No. 266, in said zones, respectively, for and during the month of February, 1936, and thereafter until ordered by the Commission, shall be as follows:

East Panhandle Sweet Gas Field, 199,045,000 cubic feet per day;

West Panhandle Sweet Gas Field, 625,803,000 cubic feet per day;

Panhandle Sour Gas Field, 378,693,000 cubic feet per day;

and same shall be allocated and prorated among the gas wells in said zones respectively, on the basis directed and ordered in said Basic Order, and the amount of gas each well is allowed to produce daily, in accordance herewith, shall constitute its daily allowable production, but no well

shall in any event be permitted to produce in excess of 25 per cent of its open-flow capacity. Schedules shall be prepared and available to all gas-well owners accordingly.

It is Further Ordered by the Railroad Commission of Texas, that effective February 1, 1936, no well producing both oil and gas shall be permitted to produce gas in excess of Eight Thousand (8,000) cubic feet per barrel of oil produced unless specially authorized by an order of the Railroad Commission to vary therefrom. The gas-oil ratio shall be the relationship of the total volume of gas in cubic feet to the total volume of oil in barrels, produced from any specific well. Any well which, by reason of its location or mode of completion, is producing with a gas-oil ratio in excess of that authorized by the Railroad Commission, [fol. 470] shall be allowed to produce daily a volume of gas equivalent to that of any other well producing from the same common source within the limits set by the Commission.

It is Further Ordered, That the reasonable lawful market demand for the East Sweet and West Sweet Panhandle Fields, shall be determined by nominations for the purchase or use of sweet natural gas submitted to the Commission in affidavit form; the form to be furnished by the Commission. However, the Commission will bi-annually, beginning January 1, 1936, reconcile the nominations with records kept by the Commission and determine the reasonableness of the demand, making the necessary rectification in the daily allowable gas production for the fields. At such times, the Commission will also make adjustment for accumulating individual well allowables and for emergencies as provided for in Section 18 of House Bill No. 266.

It is Further Ordered That this Docket be kept open to consider any claims of discrimination or hardship, and to offer administrative relief, if possible, for any hardship which might result by virtue of this Order, and that the Commission is anxious to hear at public hearing, in accordance to law, evidence as to any peculiarities as to any or all of the gas fields or reservoirs and/or gas wells affected by this order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner; Lon A. Smith, Commissioner. (Seal.)

Attest: C. F. Petet, Secretary.

[fol. 471] 28. Order of Railroad Commission

Railroad Commission of Texas

Oil and Gas Division

Oil and Gas Docket No. 108

In re Conservation and Prevention of Waste of Sweet and Sour Natural Gas in the Panhandle District of Texas

Austin, Texas, February 20, 1936.

Special Order Fixing Allowable Production of Sweet and Sour Natural Gas in the Panhandle District of Texas for the Month of March, 1936

The Commission, After due notice as required by the Statutes of Texas, held a public hearing on February 18, 1936, at Austin, Texas, relating to the proration and regulation, for the month of March, 1936, of the production of sweet and sour natural gas in the state of Texas, in accordance with the provisions of House Bill No. 266, passed by the Forty-fourth Legislature of Texas (1935), and thereat the Commission received and heard evidence and gave all parties an opportunity to be heard.

From the evidence introduced at said hearing, together with that which was received by the Commission at previous hearings involving the Panhandle Gas Field and which was re-introduced and considered as a part of the evidence at the said hearing on February 18th, 1936, the Commission finds and determines as follows:

[fol. 472] That the findings of fact contained and set forth in the Basic Order of December 10, 1935, are approved and adopted as the findings of fact which will serve as a basis for this order for the month of March, 1936, in that the Commission finds that said findings are supported by the evidence received and considered at the said hearings, and from intensive and comprehensive study of these fields through its Engineering Staff, and from a personal study and investigation by the Commission.

It is Therefore Ordered That, except as heretofore and hereinafter otherwise ordered, all of the provisions, directions, rules, regulations and orders set forth and contained

in the said Basic Order relating to the Panhandle Gas Field and the different zones thereof be and the same are hereby adopted and promulgated and continued in force and effect for and during the month of March, 1936, and that same shall continue thereafter in force and effect until otherwise ordered by the Commission.

It is Further Ordered that the daily allowable gas production computed on the basis set forth in House Bill No. 266, in said zones, respectively, for and during the month of March, 1936, and thereafter until ordered by the Commission, shall be as follows:

East Panhandle Sweet Gas Field, 179,853,000 cubic feet daily;

West Panhandle Sweet Gas Field, 669,000,000 cubic feet daily;

Panhandle Sour Gas Field, 435,518,400 cubic feet daily;

and same shall be allocated and prorated among the gas [fol. 473] wells in said zones respectively, on the basis directed and ordered in said Basic Order, and the amount of gas each well is allowed to produce daily, in accordance herewith, shall constitute its daily allowable production, but no well shall in any event be permitted to produce in excess of Twenty-five (25) per cent of its open-flow capacity. Schedules shall be prepared and available to all gas-well owners accordingly.

It is Further Ordered That this Docket be kept open to consider any claims of discrimination or hardship, and to offer administrative relief, if possible, for any hardship which might result by virtue of this Order, and that the Commission is anxious to hear at public hearing, in accordance to law, evidence as to any peculiarities as to any or all of the gas fields or reservoirs and/or gas wells affected by this order.

Railroad Commission of Texas, Ernest O. Thompson, Chairman; C. V. Terrell, Commissioner; Lon A. Smith, Commissioner. (Seal.)

Attest: C. F. Petet, Secretary.

[fol. 474] **Defendant's Case**

Testimony

F. L. PATTEN testified as follows:

My name is F. V. L. Patten. I am a chemical engineer. I obtained a Bachelor of Science Degree in Chemical Engineering in the University of Texas in June, 1931; the degree of Master of Science in Chemical Engineering in August, 1932, and the degree of Doctor of Philosophy in Chemistry in June, 1935.

Immediately after graduating I was employed by the Railroad Commission of Texas in the capacity of chemical engineer with headquarters in the Panhandle gas field. In connection with my duties in this position I established, by means of chemical tests, the line of demarcation separating the sweet and sour gas areas in the Panhandle gas field. I found that the field could be readily separated into sweet and sour gas areas, using the definition of sweet and sour gas as set forth by H. B. 266. I believe the definition of sweet and sour gas as set forth in H. B. No. 266 to be a just and logical one for the following reasons:

First, gas containing much more than one and one-half grains of hydrogen-sulphide per 100 cu. ft. of gas is so corrosive as to make it economically unfeasible for pipe lines to transport it for light and fuel uses.

Second, gas containing much less than one and one-half grains of hydrogen-sulphide per 100 cu. ft. of gas could [fol. 475] be economically taken by pipe lines in the Panhandle District of Texas, because the greater portion of the gas in the sweet gas area contains only an infinitesimal amount of hydrogen-sulphide and any gas containing up to one and one-half grains could be taken along with such sweet gas to produce a mixture which would not be corrosive. It is my knowledge that there are pipe line companies in the Panhandle District which are at the present time taking gas from gas wells containing as much as one and one-half grains of hydrogen-sulphide. In addition I might mention, that, if desired, gas of such low hydrogen-sulphide content could be treated for the removal of its hydrogen-sulphide content at a very low cost. I cite here the article by John C. Albright in the December 24, 1934, issue of the "Oil Weekly," where it is reported that gas of such hydrogen-

sulphide content has been purified at a cost of 1.07 mills per 1000 cu. ft.

Third, I found in my study of this field that there were only seven or eight gas wells of the total of more than eleven hundred wells which had a hydrogen-sulphide content between one and two grains. Thus it would appear that one and one-half grains per 100 cu. ft. of gas is a ready and apt point of division.

The definition in H. B. 266 which provides that gas containing more than thirty grains of total sulphur per 100 cu. ft. of gas shall be classified as sour, will not, in my opinion, operate to the disadvantage of any one holding properties [fol. 476] in the Panhandle gas field, because, I believe, that none of these gas wells having a hydrogen-sulphide content less than one and one-half grains will contain more than thirty grains of total sulphur.

In the course of my tests on the gas wells of the Panhandle Field I was able to classify the twenty-one wells connected to the Henderson plant. Of these I found that thirteen had hydrogen-sulphide content of less than one and one-half grains per 100 cu. ft. and therefore should be classified as sweet. Eight had a greater hydrogen-sulphide content than one and one-half grains per 100 cu. ft. and should therefore be classified as sour. Only one of the wells connected to the Henderson plant contained between one *and one* and one-half grains of hydrogen-sulphide per 100 cu. ft.

The wells which in my tests are classified as sweet could all in my opinion be taken by pipe line companies.

The Texrado Nos. 1 and 2 wells were tested by me and found to be sweet. Because of clerical error they were classified as sour in the first summary of results. However, when the proration schedules were made out this error was detected and these wells were properly classified as sweet.

[fol. 477] F. V. L. Patten further testified as follows:

In the course of my duties I have made a study of the hydrogen sulfide content of the gas wells in the Panhandle gas field, with the purpose of establishing the line of demarcation between the sweet and sour gas areas in this field. In this study I determined the hydrogen sulfide content of these gas wells by the silver salt absorption method. The Bureau of Mines, in their Bulletin No. 560, recommends this method for low concentrations of hydrogen sulfide.

I have tested approximately one hundred and fifty gas wells in the Panhandle area and as a result of these tests I have been able to establish the line separating the sweet and sour gas areas in this field, using the definition of sweet and sour gas as given in House Bill No. 266. I believe the definition of sweet and sour gas given in House Bill No. 266 to be a just and logical one for the following reasons:

First, gas containing much more than one and one-half grains of hydrogen sulfide per 100 cubic feet is so corrosive that it could not be economically taken by pipe line companies.

Second, gas containing one and one-half grains of hydrogen sulfide or less is not particularly corrosive in the absence of oxygen, and can be taken by the pipe line companies operating in this field, particularly since most of the [fol. 478] gas in the sweet gas area of the Panhandle Field contains only an infinitesimal amount of hydrogen sulfide and could be mixed with this gas of low hydrogen sulfide content to produce a mixture which would contain only a trace of hydrogen sulfide. It is my knowledge that the pipe lines in this field are now taking gas which contains more than one and one-half grains of hydrogen sulfide per 100 cubic feet in considerable quantities. As an example I will cite the Canadian River A-1 Ingerton, Section 41, Block 47, H&TC RR Survey well in Hutchinson County which I found to contain 2.98 grains of hydrogen sulfide per 100 cubic feet of gas and from which the Canadian River Gas Company took 93,868,000 cubic feet of gas in their pipe lines in the first six months of 1935. As an additional example the Texoma P-1 Taylor well, Section 244, Block 3-T, HT&B RR Survey, Moore County has a hydrogen sulfide content of 2.08 grains per 100 cubic feet, and yet the Texoma Natural Gas Company took 69,100,000 cubic feet of gas from it during this same period of time.

Third, if desired, gas of such low hydrogen sulfide content can be freed of hydrogen sulfide at a very low cost. As a substantiation of this statement, I will refer to the article by John C. Albright in the December 24, 1935, issue of the "Oil Weekly" in which it is reported that such gas has been purified at a cost of 1.07 mills per 1,000 cubic feet.

Fourth, there are a great number of wells having a hydrogen sulfide content per 100 cubic feet below one grain and

[fol. 479] only a very few between one and two grains. In the entire field containing eleven hundred gas wells there are only seven or eight wells whose hydrogen sulfide contents are between one and two grains. Thus it would appear that one and one-half grains is a ready and apt point of division.

Fifth, the wells in the Panhandle Gas Field, with a few exceptions, contain only small traces of sulfur compounds other than hydrogen sulfide. Hence, the definition in House Bill No. 266 which provides that gas containing more than thirty grains of total sulfur per 100 cubic feet shall be classified as sour should not operate to the disadvantage of any one holding properties in this field.

In the course of my study of this field I tested a number of the wells connected to the F. C. Henderson Gasoline Corporation's Sanford Plant. The result of these determinations are given in the table below:

Company	Well No.	Lease	Sec. Blk. Survey	H_2S Grs.	Content per 100 Cu. Ft.
Deal Oil & Gas	1	Sanford	81–46–H&TC	2.72	
do	2	do	81–46–H&TC	.49	
Phillips Pet. Co.	1	Operator	82–46–H&TC	14.60	
do	2	do	82–46–H&TC	7.86	
Polo Oil Co	1	Sanford	83–46–H&TC	.65	
Reliance	1	do	83–46–H&TC	.16	
Rubin	2	Rubin	Rubin Survey	.14	
Skelly	1	Sanford	82–46–H&TC	6.10	
Texarado	1	do	83–46–H&TC	.92	1.13
do	2	do	83–46–H&TC	.87	.89

[fol. 480] By means of the tests on these wells and other wells located in the same vicinity, I was able to classify the twenty-one wells connected to the Henderson Plant. I found thirteen of these wells to be sweet and eight of them to be sour.

Since the wells classified as sweet all had a hydrogen sulfide content considerably below one and one-half grains, they could, in my opinion, be taken by pipe line companies.

It will be noted that duplicate determinations were made on the Texarado #1 and #2 wells and that these wells showed hydrogen sulfide contents considerably below one and one-half grains per 100 cubic feet. Because of error they were classified as sour in the first list of well potentials. However, while the proration schedules were being made out, this error was detected and these wells were properly classified as sweet.

[fol. 481] F. V. L. Patten further testified as follows:

I have estimated the sour gas demand in the Panhandle Gas Field for the month of February, 1936, on the assumption that, wherever possible, casinghead gas residue would be used for carbon black manufacture. I have found that the probable sour gas demand will be 372,242,000 cubic feet of gas per day. The Commission has taken a value very close to this estimate, or 378,693,000 cubic feet per day as the sour gas demand for February. This has been distributed among the producing wells in the sour gas area on the following basis: 50% of the total has been distributed on the basis of the ratio between the potential of the individual well and the sum of the potentials of all of the wells in the field, and 50% has been distributed on the ratio between the acreage of the tract on which the well is located and the aggregate sum of the acreages of the tracts on which all of the wells in the sour gas area are located, with the provision that a maximum of 640 acres shall be considered for any one well and with the further provision that no well shall be given an allowable greater than 25% of its open flow potential. A number of wells on large tracts had to have their allowable decreased to this limit when the acreage allowable was so large that the total was greater than 25%.

[fol. 482] The estimated sweet gas demand for the month of February is 848,852,000 cubic feet. The sour gas demand, therefore, is 30.9% of the total demand for natural gas in this field. Mr. T. C. Craig has estimated the reserves of sweet and sour gas in this field by the pressure-volume method. He estimates the future recoverable sour gas at 6,230,000,000,000 cubic feet and the recoverable sweet gas at 15,960,000,000,000 cubic feet. According to this estimate, the recoverable sour gas is 28.1% of the total recoverable gas.

The ratio between sour gas and total demands is very nearly in the same proportion to the ratio between the sour and total reserve. The sweet gas demand is increasing more rapidly than the sour gas demand and in a short time, it should be expected that this correlation between ratios of reserves and ratios of demand will be even closer. The difference at the present time should not be sufficient to cause any appreciable migration of gas from the sweet to the sour gas area.

[fol. 483] N. B.—The Following Is Attached as an Exhibit to the Above Affidavit

Railroad Commission of Texas Gas Engineering Department Oil and Gas Division

Austin, Texas, January 15, 1936.

Estimated Sour Gas Demand Panhandle Gas Field

Summary

Carbon Black Demand	555,067 M c. f.
Sour Gas Demand	372,242 M c. f.
Sour Gas Potential	2,524,617 M c. f.
Percent of Potential that will supply the estimated demand	14.744%

Estimated Sour Gas Demand Panhandle Gas Field

This estimate was computed from the data given on the November, 1935, Form EH-4 "Gasoline Plant Report" for gasoline plants operating on casinghead and sour natural gas in the Panhandle Field.

[fol. 484] The assumptions employed in making this estimate were that casinghead gas would be used for the manufacture of carbon black wherever possible; that all wells producing more than 100,000 cu. ft. of gas per barrel of oil be classified as gas wells and placed on the appropriate gas well schedules; that a gas-oil ratio of 8,000 cu. ft. per barrel plus a displacement factor would be adopted for this field for the month of February; and that the marginal oil well so affected would not be exempt. In addition, it was assumed that all plants which used sweet natural gas for plant and lease purposes during November would continue to do so during February and that extraction losses in all of these plants would be less than 10% of the gas put into the plant.

The manner in which these assumptions were used will be clarified by the following explanation of the method employed in estimating the items in the columns of the table.

Column (1), "Intake", is the daily average intake into these plants for November as given in the EH-4 Report.

Column (2), "Extraction," is the average daily extraction loss.

Column (3), "P & L And Rep," is the daily average volume of gas used for plant and lease purposes, taken by pipe lines and used for repressuring.

Column (4), "Carbon Black," is the volume of residue gas sold to carbon black plants.

Column (5), "Total Demand." The items in this column are obtained by taking the sum of the items in Columns [fol. 485] (2), (3), and (4).

Column (6), "Casinghead Used," is the daily average casinghead gas consumption for November.

Column (7), "Decrease 100 MCF Bbl. Ratio," is the decrease in the casinghead gas consumption which will result if all wells making more than 100 MCF of gas per barrel of oil are classified as gas wells and treated as such.

Column (8), "Decrease Disp. Factor 8 1 Ratio," is the estimated decrease in the casinghead gas consumption which will result if a gas oil ratio of 8 MCF per barrel of oil plus a displacement factor is adopted for the field. This displacement factor will limit every oil well in the field to 591 MCF of gas per day. Where the gas from several wells on the same lease was measured through the same meter, it was assumed that these wells would be limited to an average of 591 MCF per day. In making the estimates in this and in the preceding column, it was assumed that marginal oil wells would not be exempt from restriction but that those wells which are now operating on water exemptions would continue to do so.

Column (9), "Shortage Sweet C. H.," was computed for those casinghead gasoline plants which are located in the sweet gas district and which do not use any sour gas.

Column (11), "Overage C. H." The Estimated excess casinghead gas was computed for the same type of plants where casinghead would be available in excess of the demand.

[fol. 486] Column (10), "Shortage Sour Gas." The items in this column were calculated for those plants operating entirely or partly on sour gas.

Where no sweet gas is consumed in the plants, the items in columns (9), (10), and (11) were computed by taking the total demand given in Column (5) and subtracting from it the available casinghead. The available casinghead, in turn, was found by subtracting the items in Columns (8) and (7) from the items in Column (6).

Where sweet gas was used to supply the light and fuel and the allowable for the connected sweet gas wells was in excess of the legitimate demand for sweet gas as given in Column (3), the shortage in casinghead or sour gas was estimated by taking the carbon black demand and adding 10% to provide for extraction losses and subtracting from this value the available casinghead. Where the total extraction loss for the plant was less than 10% of the carbon black demand, this value was used instead of 10%.

Where sweet gas was used to supply the light and fuel and repressuring demands and the sum of the allowables of the connected sweet gas wells was less than the value given in Column (3), the shortage in casinghead or sour gas was estimated by subtracting from the total demand both the casinghead available and the allowable for the connected sweet gas wells.

[fol. 487]

Estimated Sour Gas Demand for February 1936

November 1935

Plants	(1) Intake	(2) Extraction	(3) P. & L. Rep.	(4) Carbon Black	(5) Total Demand	(6) Casinghead Used	(7) Decrease 100% M.c.f./BBL Ratio	(8) Decrease Disp. Factor 8-1 Ratio	Shortage (9) Sweet C. H.	Shortage (10) Sour	Overage (11) Casinghead
Airolene	7,595	264	571	6,764	7,599	4,234	4,234	000	7,028	.....	.....
Buckeye	16,562	942	3,087	11,911	15,940	16,562	8,487	1,002	8,867	.....	.....
Coltexo	35,274	1,587	4,521	29,090	35,198	28,999	8,362	5,761	15,821	.....	.....
Crawford	4,055	406	1,652	1,997	4,055	4,055	000	898	898	.....	.....
Danciger	8,965	840	2,931	289	4,060	5,927	000	707	.....	.....	5,504
Empire	13,035	704	2,477	4,157	7,338	7,568	000	2,761	30	.....	.....
Magnolia-Kingsmill	14,704	500	614	11,022	12,136	13,100	000	000	.....	.....	1,578
" -Lefors	6,660	498	1,441	3,656	5,595	6,122	000	000	.....	.....	2,100
" Magic City	5,001	158	257	3,800	4,215	908	908	000	3,958	.....	.....
" Skellytown	8,326	303	617	6,496	7,416	7,726	000	1,502	.....	1,192	.....
Henderson	46,064	5,100	7,500	29,278	41,878	000	.....	.....	.....	32,206	.....
Pacific-American	58,461	1,754	5,800	29,499	37,053	748	.....	157	.....	30,662	.....
Phillips-Hutch-Residue	291,856	19,194	34,554	197,635	251,383	53,219	35,997	3,461	.....	203,068	.....
Phillips-Canadian	16,123	1,225	3,728	9,458	14,411	8,224	565	000	.....	6,752	.....
" Texroy	41,641	3,664	4,916	28,100	36,680	28,754	14,148	.....	.....	16,304	.....
" Gray-Residue	173,596	16,884	64,094	48,043	129,021	113,368	27,705	12,309	000	000	20,507
Portland	40,856	846	4,916	26,710	32,472	8,110	1,715	.....	.....	21,161	.....
Shamrock-Clayton	15,924	2,323	4,321	000	6,644	1,849	000	000	000	000	000
" McKee	122,156	3,410	8,350	000	11,760	000	000	000	000	000	000
Shell #2	5,865	316	334	5,318	5,968	4,623	1,025	1,825	.....	4,195	.....
" #17	17,688	743	1,084	15,630	17,457	15,834	000	9,949	.....	11,572	.....
Shell #15	6,736	502	845	5,389	6,736	6,736	000	000	000	.....	.....
Skelly-Armstrong	20,183	848	1,240	8,876	10,964	000	000	000	000	10,964	.....
" Panhandle	14,580	875	2,202	10,343	13,420	4,271	000	000	.....	9,149	.....
" King-Schaefer	52,101	2,944	7,409	41,748	52,101	25,079	5,452	1,952	.....	25,017	.....
Smith Bros-Sitter	76,932	2,307	7,667	16,167	26,141	27,189	000	13,151	3,746	.....	.....
Sunray	46,115	1,383	1,383	000	2,766	46,115	.....	.....	.....	.....	46,115
Wilcox	5,903	340	1,872	3,691	5,903	5,903	000	000	000	000	000
	1,172,957	70,860	180,383	555,067	706,250	445,224	106,598	55,435	40,348	372,242	75,804

[fol. 488] Testimony of the witness F. V. L. Patten resumed:

The Panhandle oil and gas field is the most extensive known in the world today. It has a length of about 125 miles and a width of from 10 to 40 miles and covers portions of the counties of Wheeler, Gray, Hutchinson, Moore, Hartley, and Potter. The producing formations of this field overlie a buried mountain range known geologically as the Amarillo Mountains. Oil is found in pools along the north flank of this mountain range where the producing strata dip to sea level. Gas is found higher in these structures along the flank and on the crest of this mountain range.

Approximately 17% of the gas producing territory in this field produces sour gas—that is, natural gas containing more than a trace of hydrogen sulfide. This sour gas area lies along the northern and western edges of the field. It is a very narrow belt from its eastern extremity in western Gray County to the middle of Hutchinson County. Here it broadens somewhat, attaining a width of four or five miles in extreme western Hutchinson and in eastern Moore Counties. The belt extends to the western limits of the field in Hartley County.

The hydrogen sulfide content of the natural gas in the sour gas area varies between 1½ and 300 grains. The concentration of hydrogen sulfide is highest in Moore County and lowest along the line of demarcation between the sweet and sour gas areas in Gray, Carson, and Hutchinson Counties. There are very few wells in the sour gas area which produce gas having a concentration of hydrogen sulfide of from 1½ to 30 grains per hundred cubic feet. Most of the [fol. 489] wells produce gas having a high hydrogen sulfide content.

The greater portion of the natural gas in the sweet gas area contains so little hydrogen sulfide that it cannot be detected by ordinary chemical methods. There are, however, along the line of demarcation of sweet and sour gas areas, 80 or 90 wells having a hydrogen sulfide content between the slightest trace and 1½ grains per hundred cubic feet. The average hydrogen sulfide content of these wells is about .5 grains per hundred cubic feet, as is shown in Table No. 2.

In the Panhandle Field there are 29 carbon black plants operating on casinghead, sour, and sweet natural gas.

These plants have a daily average consumption of between 500,000,000 and 550,000,000 cubic feet per day, a volume only slightly less than the average daily intake into all of the pipe lines leaving the Panhandle Field and nearly ⅔ as great as the total daily average consumption for light and fuel purposes in the entire United States.

Carbon black plants were originally attracted to the Panhandle because of the development of the casinghead gasoline industry and the consequent abundance of cheap residue gas. The first carbon black plants built in this field used residue gas obtained from the casinghead gas produced by oil wells. Only three of the carbon black plants in this field were constructed after the use of dry natural gas for the manufacture of carbon black had become legal. Two of these three plants were constructed for the purpose [fol. 490] of using the residue gas from gasoline plants which processed both sweet and sour gas. The third plant is being constructed to use sour dry gas residue.

There are no carbon black plants in this field which were constructed to use sweet dry natural gas residue only. Consequently, most of the gas residue which has been consumed by carbon black plants has come either from casinghead or sour gas wells. According to the November reports of gasoline plants operating in this field, approximately .4 of the gas residue consumed by carbon black plants comes from sour dry gas, .5 comes from casinghead gas, and only .1 comes from sweet dry gas.

With one exception, the carbon black plants in the Panhandle Field all produce less than two pounds of carbon black per thousand cubic feet of gas. The exception is the General Atlas Carbon Company's plant which operates by a different process from any of the other plants in the field and which produces approximately five times the amount of carbon black per thousand cubic feet as the other plants operating in this field. The average yield of carbon black for the other twenty-eight plants operating in this field is 1.43 pounds per thousand cubic feet, as is shown in Table 1.

The carbon black industry is an old one, having had its beginning at New Cumberland, West Virginia, in 1872. In the first plant the natural gas was passed through a gas holder to gas jets arranged in the same horizontal plane beneath slabs of soap stone pierced by a number of orifices which served to permit the passage of excess smoke and

[fol. 491] waste gas. The slabs were covered by a domed roof provided with a damper controlling ventilation. The carbon which deposited on the slabs was removed by scrapers and fell into sheet iron troughs.

In later plants the soap stone slabs were replaced by cast iron and various other mechanical improvements were introduced. In 1883, Blood devised the rotating disc process using plates only three feet in diameter as a depositing surface. The advantages of this process was that ventilating holes were unnecessary and that the plates could be made in one casting. Beneath each plate was a scraper in the center of a radial hopper through which the deposit fell into a longitudinal conveyor.

At present, nearly all of the carbon black is being produced by the channel process which was first introduced by McNutt in 1892. In this process, natural gas is partly burned in an insufficient supply of air and a smoky or sooty flame results. This flame strikes an iron channel on which most of the carbon black deposits. The carbon black is scraped off this channel and drops into a screw conveyor.

Experiments have shown that it is possible to make carbon black by several other processes. In one of these, the Thermatomic process, which is used in at least one commercial plant, natural gas is decomposed by being heated to a very high temperature. In another, natural gas is decomposed by an electrical discharge. In a third variation, natural gas is compressed to from 5 to 20 atmospheres and burned at this pressure. This latter process has been found [fol. 492] experimentally, to produce the same type of carbon black as the channel process.

All of these processes give much higher yields than the channel process but industry has shown little inclination to adopt them because they either have produced an inferior product or entailed expensive installations; and, because the gas used in the operations has always been very cheap, volume yield being unimportant. At the present time, for example, the cost of raw material is only ten to twelve percent of the selling price and it is cheaper to burn four or five times the amount of natural gas using the present machinery than to develop and adopt a process such as those which have been described.

That carbon black manufacture is very wasteful can be readily seen when efficiencies of this process are calculated

and compared with those of other means of utilizing gas. By the present methods of making carbon black, an average of approximately 1.43 pounds of carbon are produced per thousand cubic feet of gas. The total carbon in 1,000 cubic feet of residue gas will amount to from 31 to 35 pounds. Therefore, on a material basis, carbon black manufacture is less than 4½% efficient. On an energy basis, this efficiency is even smaller averaging less than .5 of 1%.

In contrast to these low efficiencies, when natural gas is used as a source of fuel, the energy efficiency varies between 15% and 75%. When used for this purpose natural gas is completely burned and the material efficiency is not to be considered. The efficiencies of the various processes for [fol. 493] making chemical compounds vary, but all of them which could be classified as efficient have either material or energy efficiency much greater than that of carbon black manufacture. For example, in the conversion of natural gas into acetylene by an electrical discharge, 30% of the carbon in the natural gas is converted as compared to the 4.5% in the present method of carbon black manufacture. The energy efficiency of this process is 15%, as compared to the .5 of 1% for carbon black manufacture.

One of the reasons for the low efficiency of carbon black manufacture is the fact that it is of such nature that it utilizes natural gas both as a source of fuel and as a raw material. Carbon black plants, therefore, can be located in the gas fields themselves. Hence, there is little expense involved in bringing the gas to the plant, and the cost of the gas at the plant is low compared to the cost of natural gas which is used for other purposes. The average cost of natural gas to carbon black plants is about .0075¢ per thousand cubic feet. The cost of natural gas when used as a source of fuel or light may be as much as several dollars per thousand cubic feet and almost invariably is as much as 10¢ per thousand cubic feet.

Since gas is used more wastefully for the manufacture of carbon black than when used for other purposes and since the efficiency of carbon black manufacture can be improved, it is in the interest of conservation to prohibit the use of any natural gas for carbon black manufacture which can be readily used for other purposes. Such a restriction will be particularly advisable if there is available an ample [fol. 494] supply of natural gas which can be used to manu-

facture carbon black but which is not suitable for other purposes.

Sour natural gas—that is, natural gas which contains considerable hydrogen sulfide—cannot be transported by pipe lines for use as light and fuel until its hydrogen sulfide content has been removed because it is very corrosive to the pipe lines; because the odor of the gas and its products of combustion are objectionable; and because it is dangerous to health. On the other hand, sour natural gas can—and is being—used for the manufacture of carbon black. The reserves of this sour gas in the Panhandle Field are sufficient to supply the needs of the carbon black industry for a number of years even at its present low recovery efficiency.

In view of these facts, the restriction of carbon black manufacture to sour gas seems logical. When such restriction is made, there is the need for a definition of sour gas. This definition should include as sour gas all gas which has a sufficient concentration of hydrogen sulfide to render it unfit for light and fuel purposes and should exclude all gas which can be taken by pipe lines. In order to determine a proper definition of sour gas, then, it is necessary to determine what concentration of hydrogen sulfide in natural gas will make it unfit to be transported by pipe lines. The definition chosen should insure that the natural gas leaving the field will contain less than this concentration of hydrogen sulfide.

As has been heretofore pointed out, the properties of sour gas which render it unfit for light and fuel purposes are (a) its odor, (b) its detrimental effect on health and (c) [fol. 495] its corrosiveness. The concentration of hydrogen sulfide which will render it unfit because of these properties will now be considered.

The odor of hydrogen sulfide is not perceptible until its concentration has reached at least .005 to .010 percent, or 3 to 6 grains per hundred cubic feet. The product of the combustion of hydrogen sulfide, sulfur dioxide, has a less penetrating and less disagreeable odor than hydrogen sulfide and, therefore, its odor will not be noticeable so long as the hydrogen sulfide concentration is only a few grains per hundred cubic feet.

Hydrogen sulfide does not cause any noticeable detrimental physiological effects unless its concentration is at

least as great as five or six grains per hundred cubic feet.

Hydrogen sulfide at low concentrations will not cause serious corrosion unless it is accompanied by water and oxygen and even in the presence of oxygen, it does not cause corrosion until its concentration has reached a threshold value of .1 grain per hundred cubic feet. The problem of preventing corrosion, therefore, is one of either keeping the concentration of hydrogen sulfide in pipelines below .1 grain per hundred cubic feet or, what is more important, insuring the absence of oxygen. (U. S. Bureau of Mines Technical Paper 560.)

Thus, it is apparent that natural gas having a concentration of hydrogen sulfide below .1 grain per hundred cubic feet certainly will be suitable for use for light and fuel purposes and natural gas having a hydrogen sulfide content [fol. 496] up to several grains per hundred cubic feet may be suitable for use for light and fuel purposes.

In House Bill No. 266, the Legislature of the State of Texas has defined sour gas as any gas containing more than 1½ grains of hydrogen sulfide per hundred cubic feet or "gas which in its natural state is found by the Commission to be unfit for use in generating light or fuel for domestic purposes." The value of 1½ grains per hundred cubic feet is a particularly apt point of division as will appear from the following discussion.

In the Panhandle Gas Field there are approximately 800 gas wells producing natural gas containing no appreciable concentration of hydrogen sulfide, 80 to 90 wells producing gas containing between the slightest trace and grain of hydrogen sulfide per hundred cubic feet, only 7 to 8 wells producing gas containing between one and two grains of hydrogen sulfide per hundred cubic feet, and a great number of wells producing natural gas having a high hydrogen sulfide content (up to 300 grains per hundred cubic feet). Gas could not be taken uniformly from all the wells in this field since the resulting gas mixture would have so high a concentration of hydrogen sulfide as to render it unfit for light and fuel purposes. On the other hand, if all gas containing the slightest trace or more of hydrogen sulfide were classified as sour gas, a very appreciable volume of gas which could be taken into pipe lines would be used for carbon black manufacture. A point of differentiation at a concentration slightly above one grain of hydrogen sulfide

[fol. 497] per hundred feet will increase the reserve of gas restricted to light and fuel purposes considerably without increasing the concentration of hydrogen sulfide in the pipe lines to a point where their life would be shortened by corrosion or where the consumers will feel any disagreeable effects. The value of one and one-half grains per hundred cubic feet is convenient because of the small number of wells having hydrogen sulfide concentrations between one and two grains per hundred cubic feet.

Table No. 2 shows the result of taking into pipe lines all natural gas containing up to one and one-half grains of hydrogen sulfide per hundred cubic feet. In this table are listed all wells which showed between the slightest trace and one and one-half grains of hydrogen sulfide in the tests made by the Railroad Commission during June and July of 1935. In Column 4 of this table is given the hydrogen sulfide content of this gas in grains per hundred cubic feet. In Column 5 is given the January daily allowable in thousands of cubic feet. The product of the hydrogen sulfide content and the allowable multiplied by ten gives the number of grains of hydrogen sulfide which will be introduced into the pipe lines of the producers of sweet gas each day during this month. The sum of these products is 263,800 grains. The total allowable for sweet gas in the West Panhandle Field for the month of January is 625,803 M.C.F. daily. The effect of the introduction into the pipe lines of this natural gas containing a trace of hydrogen sulfide will be, therefore, to increase the hydrogen sulfide content of

[fol. 498] the gas leaving the field $\frac{263,800}{625,803} \times 10$, or approximately .04 grains per one hundred cubic feet.

These calculations have been made on the assumption that all of this gas containing between a trace and 1½ grains of hydrogen sulfide will be taken by pipe lines. It is a fact, however, that a greater portion of this gas will be used for light and fuel purposes by natural gas plants. The total sweet natural gas demand by natural gasoline plants in the West Panhandle Field during January was 101,125 M.C.F. daily. Since these gasoline plants are in general connected to sweet gas wells containing between a trace and 1½ grains of hydrogen sulfide per hundred cubic

feet of gas, the effect of this definition will be to make the hydrogen sulfide content of the natural gas leaving the field considerably less than .04 grains per hundred cubic feet. Since natural gas can contain at least .1 grain of hydrogen sulfide per hundred cubic feet without being detrimental to pipe lines, this definition of the hydrogen sulfide conte which will render natural gas sour is certainly not too high.

That the pipe lines operating in this field recognize the fact that the introduction of a trace of hydrogen sulfide will not be detrimental is shown by the fact that through June, 1935, the Texoma Natural Gas Company had taken 406,657 cubic feet from its Taylor P-1 well which was found by the Railroad Commission to have a hydrogen sulfide [fol. 499] content of 2.08 grains per hundred cubic feet. The Canadian River Gas Company, up to the same time, had taken 1,534,588 M.C.F. from its Ingerton A-1 well which was found to have a hydrogen sulfide content of 2.98 grains per hundred cubic feet.

It has been said that, since sour natural gas can be treated to remove its hydrogen sulfide content, no distinction should be made between the sweet and sour gas. The cost of treatment, however, may be quite high. This cost varies with the concentration of hydrogen sulfide. That is, the greater the concentration of hydrogen sulfide, the greater will be the cost of this treatment. Since a greater portion of the gas in the sour gas area of this field has a very high hydrogen sulfide content, the cost of its treatment would probably be prohibitive.

[fol. 500]

Table I

Summary of the Operations of Carbon Black Plants in the Panhandle Field

Company	Plant	Daily Gas Consumption M c.f.	Gas Consumption for Month M c.f.	Carbon Black Produced lbs.	Lbs. Carbon Black per M. c. f.—Natural Gas
Better Blacks	Powell	289	8670	1500	.17
Cabot Company	Armstrong	9053	271590	350300	1.27
Cabot Company	Kingsmill	27363	820890	1137000	1.37
Cabot Company	Schafer	55680	1670400	2222000	1.33
Coltexo Corporation	Lefors	31662	949,860	1758000	1.85
Combined Carbon Co.	Sanford	27930	837900	1083710	1.30
Crescent Carbon Co.	Borger	11034	331032	457625	1.38
J. M. Huber Co.	Borger	29499	884970	1437200	1.62
J. M. Huber Co.	Skellytown	7226	216780	326050	1.50
Magnolia Pet. Co.	Magic City	3800	114000	188525	1.65
Magnolia Pet. Co.	Pampa	3656	109780	214075	1.95
Panhandle Carbon Co.	Panhandle	12831	384935	624738	1.62
Texas Elf Carbon Co.	Bowers	57007	1710210	2634000	1.54
United Carbon Co.	Alexander	26348	790440	987150	1.25
United Carbon Co.	McIlroy	27816	834480	975,712	1.15
United Carbon Co.	Morrick	9877	296310	467250	1.58
United Carbon Co.	Rock Creek	45092	1352760	1896320	1.40
United Carbon Co.	Sanford A	13242	397260	517475	1.30
United Carbon Co.	Sanford B	14578	447340	482050	1.18
United Carbon Co.	Stinnett	9196	275880	432750	1.57
Western Carbon Co.	Borger No. 51	19447	583410	824575	1.41
Western Carbon Co.	Kingsmill	25682	770460	1067600	1.37
Western Carbon Co.	Lela	12358	370740	344175	1.02

[fol. 501]

Western Carbon Co.	Lefors	12028	360840	618225	1.71
Western Carbon Co.	Magic City	6734	202020	388700	1.68
Western Carbon Co.	Pampa	4861	115830	202200	1.91
Western Carbon Co.	Wescar	55744	1672320	2322076	1.38
Peerless	Coltex	1277	38310	19088	.50
All Plants*		558744	16817417	23980069	1.43

* General Atlas Carbon Co. not included because it does not use the same process as the other plants.

[fol. 502]

Table II

Company	Lease	Well #	Hydrogen Sulfide Content Gr. 1000 c. f.	January Allow. M. c. f.	Grains of Hydrogen Sulfide	Connection
American Refining	Burnett	4	.16	342	550	Phillips
Antelope Creek	Sanford	3	1.32	109	1440	"
		4	.81	311	2520	"
R. A. Burnett	Burnett (Silk)	1	.824	275	2270	"
Burnett	Burnett (Gates)	1	.339	786	2660	"
Canadian River	Bivins	A–7	.35	1937	6790	Canadian River
Cities Service	Burnett	16–A	.50	1557	7790	Cities Ser.
	Hughey	1	.10	1314	1310	"
	Wall	2	.43	970	4160	"
Combination O & G	Allspaugh	1	.28	251	700	
Continental	Bryan	3	.35	407	1420	Skelly
	Burnett*	H–1	.61	884	5400	Phillips
	Burnett*	2	.21	281	590	"
		C–3	.59	1066	6290	"
		1	.36	498	1790	"
	Johnson	1–E	.20	1259	2520	"
Deal O & G	Sanford	2	.49	126	620	Henderson
Dixon Creek	Sneed	1	.20	350	700	Skelly
	Ellen	1	.74	789	5840	None
	Johnson	1–E	.37	238	880	Phillips
Empire	Jordon-Brown	1	.60	515	3090	None
Hutchinson Drlg	Percival	3	.97	183	1780	"
Huber	Christian	3	.31	661	2050	Pac. Am.
		2	.26	384	1000	"

[fol. 503]

	Blackburn	1	.34	705	2390	Pac. Am.
	Christian	1	.47	773	3640	"
	Cheatham	1-A	.18	705	1270	"
	Penney-Johnson	B-1	.20	268	540	"
International Prod	McConnell	3	.81	282	2280	"
Interstate	Burnett	1	.80	249	1990	Portland
A. L. Johnson	Ellen	1-100	.42	1024	4300	No. Am.
Magnolia	A. Burns	1	.51	3984	20310	Portland
	McConnell	1	.39	192	750	Phillips
	Latham	1	.61	1074	6550	Skelly
	H. Burnett	1	.29	319	920	Magnolia
Mid-Pool	Johnson	1	.29	192	560	Phillips
North American	Burnett	1	.33	321	1060	"
	Burnett	1-97	1.42	1172	16630	No. Am.
Phillips	Cheatham	1-98	.57	1898	10820	"
	Eagle	2	.18	258	470	Phillips
	Garner	1	.23	643	1480	"
	M. Johnson	1	.17	265	450	"
	Katz	1	.12	377	450	"
		1	.26	306	800	"
	McMann	2	1.31	256	3360	"
		1	.83	963	8000	"
		2	.54	462	2490	"
	P-Bivins	1	.35	444	1550	"
Phillips	Royal	1	.28	476	1330	Phillips
	D. Trammel	1	.25	346	870	"
Palo Oil Co.	Sanford	1	.645	873	5630	Henderson
Reliance	"	1	.16	530	850	"
Rubin	Rubin	2	.14	346	480	"

[fol. 504]

Table II—Continued

Company	Lease	Well #	Hydrogen Sulfide Content Gr. 1000 c. f.	January Allow. M. c. f.	Grains of Hydrogen Sulfide	Connection
Sinclair-Prairie	Johnson	1-D	.81	1032	8350	None
		1-B	1.31	790	10340	None
		1-C	1.02	428	4360	"
	Reed	1	.48	680	3240	Phillips
Skelly	Bivins	1	.38	642	2440	"
	McKay	1	.61	1744	10630	Skelly
Texrado	Sanford	1	1.02	1264	12890	Henderson
		2	.88	485	4270	"
Texas Co	M. C. Burnett	2	.22	410	900	Phillips
		6	.72	236	1700	"
	McConnell	1	.86	612	5260	Skelly
	Burnett	3	.68	664	4510	Phillips
Texoma	Burnett	19-G	.72	1371	9870	Texoma
	Cantrell	1-E	.11	648	710	"
	Gober	1	.14	1669	2340	"
	Garner	A-2-M	.56	2453	13720	"
Texwell Oil Co	McConnell	1	.63	142	890	Skelly
Totals		73	.52 Ave.	50366	263800	

[fol. 505] The Operations of the F. C. Henderson Company's Gasoline Plant Since August 1, 1935

Railroad Commission of Texas

Oil & Gas Division

Gas Engineering Department

F. V. L. Patten

Chemical Engineer

Tables 1, 2 and 3, hereinafter set forth, are a summary of the operations of the F. C. Henderson Company at their Sanford Gasoline Plant, since House Bill 266 went into effect the first day of August, 1935. The data shown in these tables was copied from the monthly Form EH-4, "Gasoline Plant Report", sworn to by an agent of the F. C. Henderson Company.

Table 1 is a summary of the daily intake for the months of August, September, October, November and December of 1935, and January of 1936. It will be noted that during the months of August and September, the intake of sweet gas was 6,972 M.C.F. and 5,616 M.C.F., respectively. On October 3rd, the Henderson Company obtained a Federal Court injunction, restraining the Railroad Commission from interfering with this company's taking sufficient natural gas to supply its demand for residue gas for carbon black manufacture. In this month there was a tremendous increase in the intake of sweet natural gas into this plant, the daily average being 38,591 M.C.F.

[fol. 506] In column five of Table 2, it can be seen that this excess volume of sweet gas was, for the most part, blown into the air. During the months of November and December of 1935 and January of 1936, somewhat smaller volumes of sweet gas were taken in by this plant and a somewhat smaller volume of residue gas was blown into the air. The volume of residue gas blown into the air, however, was still quite an appreciable quantity, the daily average volumes for these three months being 3,766 M.C.F., 3,730 M.C.F. and 6,530 M.C.F., respectively. These volumes of gas blown into the air represent gas taken in excess of carbon black needs, and the taking of gas in excess of that required for carbon black manufacture was not permitted

by the injunction granted to this company. These operations, therefore, are a direct violation of the provisions of House Bill 266, which was not permitted under the terms of their injunction.

The volumes of gas actually blown into the air by this plant were probably considerably greater than those shown by the reports of this company, since the volumes used for extraction loss as reported by this company were considerably larger than the true decrease in volume of such gas, because of the extraction of its natural gasoline content. In column one of Table 3 is shown the true extraction loss for natural gas of approximate gasoline content of the natural gas consumed by the Henderson Company. Column two shows the excessive extraction loss shown by this company on its gasoline plant reports. These volumes of gas [fol. 507] added to the volumes shown to have been vented into the air will probably give the true volumes of gas blown into the air.

Column three of Table 3 shows the volume of sweet gas used for carbon black manufacture or blown into the air during these months. The volumes shown in this column were obtained by taking the volumes of sweet gas taken into the plant, subtracting therefrom the extraction loss on such sweet gas, the volume of gas used in the plant for plant and lease use and for other uses. It will be noted that this volume of sweet gas consumed for carbon black manufacture or blown into the air is approximately equal to the volumes of natural gas vented into the air by this company during the months of October, November and December of 1935 and January of 1936. In other words, the excess sweet gas consumed by this plant was not needed to supply the carbon black demand, but was blown into the air.

[fol. 508]

All tables are in M cu. ft.

Table 1.—Intake

Month	Total	Sour Gas Wells	Sweet Gas Wells
August	39,129	32,157	6,972
September	43,610	37,994	5,616
October	72,260	33,669	38,591
November	46,064	32,633	13,431
December	46,895	32,670	14,198
January	49,929	35,561	14,368

Table 2.—Disposition

Month	Extraction Loss	Plant & Lease	Carbon Black	Other Uses	Vented to Air
August	2,572	7,500	27,978	400	6,679
September	2,500	7,500	29,275	400	3,935
October	7,000	7,500	29,485	400	28,275
November	5,100	7,500	29,278	400	3,766
December	5,400	8,000	29,365	400	3,730
January	5,776	8,000	29,223	400	6,530

Table 3

Month	True Extraction Loss	Excessive Extraction Loss	Sweet Gas Used for Carbon Black or Blown to Air
August	2,320	552	000
September	2,264	236	000
October	3,755	3,245	29,087
November	2,220	2,880	4,886
December	2,255	2,145	5,114
January	2,374	3,398	5,278

[fol. 509] Drainage Conditions in the Sanford Area

Sanford, Texas, is located about ten miles west of Borger in the Panhandle Gas Field. It lies along the line of demarcation between the sweet and sour gas areas of this field. The region around Sanford was first developed as an oil field in 1926 and 1927. The oil sand was quickly depleted, however, and the oil wells were converted into gas wells. As a result of this early development as an oil field, the Sanford area is characterized by close spacing of wells in marked contrast to the wide spacing which is prevalent in the greater part of the Panhandle Gas Field.

In May, 1928, the Phillips Petroleum Company began operating a gasoline plant in this area. This plant, known as the Sanford Plant, was first built to use the casinghead gas from the oil wells in this district but later, after the passage of the "sour gas law", it was enlarged and converted into a dry gas stripping plant. Since House Bill 266 has gone into effect, this plant has been used to process sour gas, the residue being used in carbon black plant.

The Henderson Company began operating its plant at Sanford in August, 1929. It was operated on dry gas as a stripping plant until it was closed by a Federal Court order in 1932. The operation of this plant was resumed under a permit from the Railroad Commission in February, 1933. From this time until November, 1935, it was operated as a stripping plant although, beginning in May, 1935, some residue gas was sold to carbon black plants. During the [fol. 510] period from February, 1933, to November, 1935,

a total of more than 83,000,000,000 cubic feet of residue gas was blown into the air by this plant. Since November, 1935, this plant has been operated under a Federal Court injunction which has permitted it to take quantities of dry natural gas sufficient to satisfy its demand for residue gas to be sold to carbon black plants. During this period of time, however, var-ing quantities of residue gas from this plant have been blown into the air.

Table 1 shows the cumulative withdrawals up to July, 1935, for the wells connected to the Henderson Plant. This company has withdrawn a total of 94,688,714,000 cubic feet of gas from twenty-one wells located on 1201 acres, an average production of 78,842,000 cubic feet per acre. This is a greater average per acre withdrawal than any other gasoline plant or any pipe line operating in the Panhandle Gas Field, and is much greater than the average for the field. The average per-acre production to July 1, 1935, for all of the operators in the Panhandle Gas Field was approximately 3,200,000 cubic feet. Hence, the Henderson Company has withdrawn more than twenty-four times as much gas per acre as the average for the field.

Estimates of the reserves of the Panhandle Gas Field by various engineers and geologists show that there was originally an average of between 16,000,000 and 25,000,000 cubic feet of gas per acre in this field. The Henderson Company, therefore, has withdrawn between three and four times its estimated original reserve.

The cumulative withdrawals of the wells around Sanford which are not connected to the Henderson Plant are shown [fol. 511] in Table 2. The per-acre withdrawals for these wells average only one-fifth of the per-acre withdrawals for the Henderson Company, and yet they are approximately five times as great as the average per-acre withdrawals for the entire field.

The result of the excessive withdrawals by the Henderson Company and other operators around Sanford has been to create a low pressure area. The average rock pressure of the wells connected to the Henderson Plant was 190 pounds per square inch in July, 1935, and the average pressure for all of the other wells around Sanford was 194 pounds per square inch. When it is considered that the average weighted rock pressure for the entire field at this time was 365 pounds per square inch, it will be apparent that any drainage which may occur will be in the direction

of the Sanford area and the wells connected to the Henderson plant in particular.

This drainage condition is shown more clearly by the pressure gradients in Figure 1. From this figure, it can be seen that the pressures in the immediate vicinity of Sanford are lower than the pressures in all directions away from this region. Seventeen of the twenty-one wells connected to the Henderson Plant are located within the 190-pound per square inch contour. This is a closed contour line and the pressures in all directions around it are higher than the pressure within this contour. Thus, it is apparent that these seventeen wells are now draining both sweet and sour gas from the area around them and will continue to do so for many years. We must conclude, then, that these wells cannot lose gas by any distinction in uses which gives a somewhat larger allowable to either the sweet or the sour gas area.

[fol. 512]

Table 1

Cumulative Withdrawals for the Wells Connect- to the Henderson Company's Sanford Plant

Company	Well No.	Lease	Acres	Sec., Blk., Survey	Prod. Thru June, 1935	Production per Acre M c. f.	July, 1935 Pressure
Deal O & G	1	Sanford	40	81-46-H&TC	7,768,594	194,215	186
"	2	"	40	81-46-H&TC	698,760	17,469	185
Henderson	1	Cont. Whitt.	95	1-Yantes	3,205,608	33,743	205
"	2	"	95	1-Yantes	2,458,359	25,877	N.P.
"	1	N.-A. Sanford	80	85-46-H&TC	4,320,092	54,001	210
North American	1	Sanford	160	87-46-H&TC	7,008,992	43,806	230
Paramount	1	Bivins	320	86-46-H&TC	166,180	519	240
"	2	Sanford	27	82-46-H&TC	1,489,227	55,157	168
"	3	"	27	82-46-H&TC	5,618,863	208,106	190
Phillips	1	"	27	82-46-H&TC	3,288,350	121,798	162
"	2	Operator	30	82-46-H&TC	5,396,594	179,886	185
Polo Oil Co	1	"	30	82-46-H&TC	2,879,118	95,971	165
Reliance	1	Sanford	10	83-46-H&TC	5,342,510	534,251	185
Rubin	2	"	20	83-46-H&TC	5,038,979	251,999	185
"	3	Rubin	10	Rubin	2,686,979	268,698	185
"	4	"	10	Rubin	4,119,132	411,913	195
		"	20	Rubin	5,295,691	264,785	190

[fol. 513]

Skelly	1	Sanford	40	82-46-H&TC	7,689,923	192,248	176
Texrado	1	"	40	83-46-H&TC	15,366,064	192,076	180
"	2	"	40	83-46-H&TC	*	*	180
Underwood et al	1	Johnson	40	Lot 4-Williams	4,850,699	121,267	190
Totals			1201		94,688,714		
Averages						78,842	190

N. B. The map hereinabove referred to as being attached to this testimony is sent up in the original by order of the Court.

These production figures were compiled from reports filed with the Railroad Commission and the Comptroller's Department, and are substantiated by affidavit.

[fol. 314] Table 2

Cumulative Withdrawals for the Gas Wells Not Connected to the Henderson Company's Sanford Plant

Company	Well No.	Lease	Acres	Sec., Blk., Survey	Prod. Thru June, 1935	Production per Acre M c. f.	July, 1935 Pressure
Alamosa	4	Sanford	20	83-46-H&TC	1,906,211	95,311	172
"	2	"	20	"	1,495,020	74,975	172
"	3	"	20	"	6,995,676	349,789	187
"	B-5	"	80	"	2,026,680	25,333	205
Antelope	2	"	160	82-46-H&TC	948,510	7,603	179
"	3	"	20	"	1,319,874	65,999	182
"	4	"	20	"	2,726,470	136,323	185
Continental	1	"	443	80-46-H&TC	2,151,912	26,899	200
"	1-C	"	640	79-46-H&TC	1,294,440	4,045	201
Huber	1-B	"	80	81-46-H&TC	3,751,908	46,899	180
Muen Rio	1	"	40	82-46-H&TC	3,052,231	76,305	191
Phillips	1	Andorf	80	80-46-H&TC	161,662	2,021	212
"	1	Bivins	80	84-46-H&TC	1,779,207	22,240	189
"	1	Land	20	83-46-H&TC	1,998,430	99,921	185
"	2	" "	20	"	10,155,989	507,799	186
"	1	McMann	120	"	6,205,048	51,709	185
"	2	"	120	"	2,416,716	20,139	188
"	1	McMillan	40	82-46-H&TC	543,335	13,583	193
"	1	Otis	40	"	2,412,577	60,314	182
"	2	"	40	"	640,678	16,017	191
"	1	Glass	80	80-46-H&TC	1,016,411	12,705	188
[fol. 315]							
Phillips	1	Pool	40	82-46-H&TC	1,281,283	32,032	182
"	2	"	40	"	1,954,624	48,866	182
"	1	Sanford	280	"	1,528,682	5,460	284
"	1	Joe Williams	640	43-47-H&TC	2,078,161	3,247	257
"	1	J. L. Williams	640				
Texoma	A-1-G	Sanford	80	82-46-H&TC	2,126	27	196
"	1-G	"	320	81-46-H&TC	2,128	7	190
Skelly Oil Co.	1	Bivins	160	84-46-H&TC	7,689,923	48,062	191
Williams	1	Sanford	80	80-46-H&TC	4,780,527	59,756	
Canadian River	A-1	Ingerton	640	41-47-H&TC	1,534,588	4,796	210
Dixon Creek	1-B	Johnson	80	Gammel	1,366,922	17,086	180
"	1-E	"	80	71-X03-H&OE	1,853,702	23,171	180
Totals			5303		79,070,660		
Averages						14,911	194

[fol. 516] There is ample sour and casing-head gas in the Panhandle field to supply the demand of the carbon black plants in that field. The average casing-head gas volume taken into gasoline plants during the month of August, 1935, was 447,665 M.C.F. The daily potential of all the sour gas wells in that district was 1,663,863 M.C.F. The total volume of gas used for carbon black manufacture was 484,982 M.C.F. This would mean that if all of the carbon black plants were properly connected to gasoline plants the sour dry gas wells in this district would have to operate at only 2% of their daily open flow potential to supply the carbon black demand. For the month of November, 1935, under the existing system of connections, the Railroad Commission has calculated that the sour gas demand will be 296,000 M.C.F., an average of only 18% of the daily potential of these wells. Thus, we can see very readily that this restriction of carbon black manufacture of casing-head gas and sour gas will not cause a shortage of carbon black. It may be added further in this connection that, it is a well known fact that within the past few years there has been not a shortage, but an over-production of carbon black. This over-production has resulted in greatly reduced prices for carbon black, and the consequent necessity for a voluntary proration of the carbon black market among the various producers.

[fol. 517] Cross-examination of the witness, F. V. L. Patten.

By Mr. Fischer:

I have been employed by the Railroad Commission since June, 1935; up to that time I was a student at the University of Texas. I have made several affidavits, in one of which I say there are several processes for the manufacture of carbon black. With reference to the thermatomic process used in at least one commercial plant, I refer to Mr. Boardman's plant in Monroe, Louisiana. I assume that that is his plant. I say that plant makes carbon black that has been referred to and is referred to as carbon black. It is a different type of material that is itself used for different purposes than carbon black made by the channel process.

I have seen the specifications of rubber tire manufacturers for carbon black that goes into rubber tires. I have not

tested the products at Mr. Boardman's plant to see whether or not it complies with those specifications. I say that it is carbon black because books I have read refer to this thermatomic product as carbon black, that is what I mean by my testimony. I have not analyzed the chemical constituents of any of the products made in the thermatomic plant. From my own tests I don't know whether the particles are large in comparison with the particles manufactured by the channel process, nor the color. Nor have I compared the products made with the thermatomic plant with the actual carbon black manufactured in the channel plant.

The thermatomic process is a cracking process; that is, it is natural gas decomposed by being heated to a high temperature. I have not seen a thermatomic plant in operation, nor have I seen the one involved here. What I know about that is what I have read about it. We have conducted a number of experiments of decomposition of natural gas [fol. 518] by electrical discharge, and under certain conditions, and you do get a very fine amorphous carbon. These have been experiments in the chemical laboratory.

Q. Have you ever seen one of these electrical discharge plants?

A. As far as I know there are no commercial plants in operation.

Q. Have you ever seen anyone trying to make carbon black, outside of duly chemical experiments; have you ever seen one of these plants in actual operation?

A. That process, as I say, that is merely—I want to save time—I will say that is merely a result of experiment. Experiments show it is possible to produce a finely divided amor-h*b*us carbon by eletcrical discharge.

By electrical discharge is meant that you pass the electricity through the natural gas. The type of discharge you have will depend upon the pressure you maintain. As the pressure increases the character of discharge changes, and the type of carbon you obtain at different pressures may differ, and the type of other products you obtain will differ. I don't understand what you mean in your statement that there is a difference between chemistry, analysis of contents, and the putting into actual physical operation equipment to carry out what chemists find should be done

in our laboratories. The electrical discharge test works perfectly in our laboratories and is workable.

Q. You are not prepared to tell this Court of any actual physical equipment you have today to commercially utilize gas in that character of process, are you?

[fol. 519] A. I am not prepared to say definitely.

Q. All right. You got that from your reading?

A. No, from experiment.

Q. From your experiment. You didn't read anything about anybody else making experiments along that line?

A. Well there have been experiments conducted.

In the third variation, natural gas is compressed to from five to twenty atmospheres, that means from 75 to 300 pounds. One atmosphere is fifteen pounds. In order to put that sort of process in operation you would not have to mix ten times as much air as gas, and that I might mention, is the reason for that increased yield of carbon black in burning it at this high pressure, because the mixture which is burned at high pressure will contain more natural gas than it will at atmospheric pressure.

I said that the total carbon in 1000 cubic feet of residue gas amounts to 31 to 35 pounds, and the total recovered carbon black is 1.43 pounds, which is the average for the Panhandle field. By that I mean less than 4½% of the carbon in natural gas is recovered as carbon black on a material basis. As for the commercial value that the element carbon has, it would depend upon the form in which you extracted it. It has great value when extracted in the form of carbon black. If you extract 31 pounds from 1000 cubic feet, it would depend upon the state of the carbon when you had extracted it. If it were finely divided, in the same form it is as extracted in the channel process, it would be just as valuable. I know that 30 pounds of carbon, a thousand cubic feet, with particles as fine as when extracted by the [fol. 520] channel process have not been extracted from natural gas, but there is no law of nature which says that it cannot be done.

Q. Let me ask you this question, do you mean to tell this Court that carbon black and the element carbon are one and the same thing?

A. They are one. I will say carbon black is the element carbon, finely divided, amorph-us form, and in that sense

they are the same thing. That would be like saying that animals and horses are the same thing. A horse is an animal, but an animal does not necessarily have to be a horse.

Q. It would be the same as saying that refined steel was the same as iron ore from which it was made?

A. No, I wouldn't say that. That is not a proper comparison.

I say that when natural gas is used as a source of fuel the energy efficiency varies between fifteen and seventy-five per cent. I have not attempted any experiments as to the energy efficiency of natural gas used on a cook stove, and I am not prepared to give any information on it. I have heard various estimates made on that, as a matter of fact. I do not know what the efficiency is by carrying out experiments. I might do that, though.

Cross-examination.

By Mr. Allen:

I made an affidavit on October 31, 1935, that was filed in this case, on the previous Portland case, or both of them. That affidavit which was filed on October 31, 1935, is the affidavit referred to. I prepared an article "Waste in the [fol. 521] Manufacture of Carbon Black" about the 15th of January. I had read several articles between those two periods of time as to the treatment of gas to remove its hydrogen sulphide content. I don't remember the exact article that I read but I read several articles. Mr. John C. Albright is the man who writes special articles for the oil weekly. I wouldn't feel competent to give you an opinion as to his status in the industry, but on October 31, 1935, I thought enough about it to swear to a statement of his that I had read from. That was all the information on it. That was the only article I had read at that time. 1.7 mills was for gas of low hydrogen sulphide content. Gas of such low hydrogen sulphide content I referred to as gas below a grain and one-half. Gas below a grain and one-half does not have to be treated. It is sweet gas under the law. You can burn it for light or fuel without treating it. With reference to the hydrogen sulphide content in the cases about which John C. Albright wrote his article in the oil and gas journal, they ranged, as I remember, around three grains, which is only a trace of hydrogen sulphide,

comparatively speaking... That is the article which I read from which I made that affidavit.

[fol. 522] A. M. CROWELL testified as follows:

My name is A. M. Crowell. I am a Natural Gas Engineer. I graduated from the University of North Carolina in 1926 with a degree of A. B. in engineering, and since that time have taken special courses at the University of Oklahoma and the University of Kansas in natural gas and its measurement and control. Since graduating I have constantly been engaged in the natural gas business in the practice of my profession and have extended experience in most phases of that profession. Immediately after graduating I was employed by the Cities Service Company as Natural Gas Engineer and worked in their gas properties in the States of Kansas, Oklahoma and Texas. I was with them for a period of approximately four and one-half years. I was next employed by the Del Rey Oil and Refining Company in the same capacity at Los Angeles, California, for a period of about two years, being in charge of field measurement in the Venice field. Following that I was employed by the Shamrock Oil and Gas Company of Amarillo, Texas, and was with them until employed by the Railroad Commission of Texas in 1933 in the capacity of Deputy Supervisor and Natural Gas Engineer, headquartered in the Panhandle Gas Field. My duties with the various companies above mentioned consisted of production, measurement, control, transportation and disposition of natural gas. The [fol. 523] duties which I am authorized to perform and have performed as Assistant Deputy Supervisor of the Panhandle Gas Field is the compiling of reports and data concerning the gas field; the testing of all gas wells from time to time for the purpose of determining their potential capacities; the enforcement of all proration orders with respect to the allowable production of gas from each well in the field; making all tests necessary to keep a continued check upon the status of well pressures in the field; examination from time to time of the characteristics of the content of the gas produced, particularly with respect to its content of hydrogen sulphide, which is the distinguish-

ing characteristic and feature making what is commonly called "sour gas"; the checking and control of all gasoline extraction plants, carbon black plants, gas pipe lines, oil refineries in the Panhandle Gas Field.

This field as a whole contains 1,504,386 acres of proven productivity, of which 1,066,662 acres are productive of sweet gas, that is, gas which is clearly suitable for use as light and fuel, and there are 437,724 acres which produce sour gas, a gas not suitable for use as light and fuel, unless and except it be chemically treated for the purpose of removing its content of hydrogen sulphide.

While employed by the Del Rey Oil and Refining Company extensive tests were run on the removal of small quan- [fol. 524] tities of hydrogen sulphide from gas by the Southern Counties Gas Company, who purchased residue gas from the Venice plant of the Del Rey Oil and Refining Company. They found that the cost per thousand cubic feet of gas in removing its hydrogen sulphide content and making it suitable for light and fuel use was 1.07 mills.

The Panhandle field is 140 miles long, with an average breadth of from 5 to 40 miles, and constitutes a common reservoir from which is produced both sour and sweet gas. Although it is the contention of reputable geologists that all of this gas is produced from a common pool, there is a division point in Gray County, which is both unproductive of gas and has a very low rock pressure in the wells that do produce some gas. This point was used by the Commission in dividing the Panhandle Field into an East and West zone.

Between 75% and 80% of the carbon black manufactured in the world is manufactured in the Panhandle field. This carbon black has been made from a group of plants located over the extent of the Panhandle field, some of which have utilized sour gas and some of which have utilized sweet gas in the manufacture of carbon black. It is general knowledge, arrived at by tests and computations, that there is enough sour gas present in the Panhandle reservoir of sour gas to supply the carbon black demand of the world for [fol. 525] some time. It is necessary for several carbon black plants which have been utilizing sweet gas in the manufacture of their production, and which are not located closely adjacent to a sour gas supply, to relocate their plants in close proximity to a supply of sweet gas and to

construct a pipe line from the source of sour gas to the present location of the plant for the continued manufacture of carbon black. This fact is one of the reasons that the law gives a period of two months between the allocation of sweet gas and the allocation of sour gas.

The Henderson Company is now connected to a carbon black plant operating under the name of the Combine Carbon Company. The Pampa office of the Railroad Commission has been informed that the capacity of this plant is 30,000,000 cubic feet per day. Since sour gas only may be utilized in the manufacture of carbon black it is well to note that the Henderson Company has an allowable of 30,835,000 cubic feet of sour gas at the present time, which is more than enough to supply this demand.

The Henderson Company show on their monthly gasoline plant report furnished to the Railroad Commission each month and substantiated by affidavits, that they have a light and fuel market for 8,000,000 cubic feet of gas each [fol. 526] month under the usage of plant and lease. The present allowable of sweet gas connected to the Henderson Company is 7,507,000 cubic feet, which is approximately enough to supply this demand. It is known by the Commission that a gas pipe line company operating a pipe line close to the Henderson plant have requested the Henderson Company to tender them any gas which they have for sale for light and fuel market.

A. M. Crowell further testified as follows:

Gas was first discovered in northern Potter County, Texas, in December, 1918, and was encountered at a depth of 2,605 feet. The gas production for several years was developed only incidentally in the search of oil. The first [fol. 527] important oil was discovered in 1925 and the major oil pools were developed in 1926 and 1927. The development of the gas field became prominent about 1926, and continued until 1929 when it was temporarily halted by the "depression". Since 1933, the gas field has been developed at a very rapid rate.

The oil wells in the oil pools in the field were, as a general rule, drilled through one or more gas-containing strata before entering the oil-contained stratum, and, in many instances, the wells were so completed as to cause production of gas from the gas strata along with the oil and gas from

the oil stratum, with the result that tremendous quantities of gas have been produced with the oil, large portions of it coming from gas-producing strata above the oil-producing strata. This gas was in large part blown into the air, and it has been estimated that in excess of two trillion cubic feet of gas produced in this manner has been wasted into the air.

Coincident with the development of the Borger pool, casinghead gasoline plants were erected therein in which considerable portions of the gas produced therein were processed for the extraction of the gasoline content thereof, and, there being no market for the stripped gas, called "residue Gas", resulting from the operations of said plants, the bulk of such residue gas was wasted into the air. In varying degrees, the same is true of the other oil pools as they were developed and operated.

The Panhandle Field is so far removed from centers of population and industrial activity that little value was at [fol. 528] first placed upon the enormous quantities of gas therein found, but, due to the development of the casinghead gasoline plants and the resultant abundant supply of cheap residue gas that was being wasted into the air, the carbon black industry was attracted to the area, and in September 1926, the first carbon black plant was completed. It was located in the Borger pool, and proceeded to burn considerable quantities of such residue gas for the manufacture of carbon black. Thirty additional carbon black plants have since been built and placed in operation in the field. The combined throughput capacity of said plants is approximately 570,000,000 cubic feet of gas daily. In excess of 70 per cent of the carbon black manufactured in the United States is being manufactured in the Panhandle Field.

The carbon black industry, including existing carbon black factories, equipment and residue gas transportation lines from natural gasoline plants, had become established in the Texas Panhandle oil and gas field prior to August 12, 1931, with the following exceptions:

1. About November 1935 ground was broken for a carbon black factory in Moore County, Texas.

2. The factory of the Combine Carbon Company was constructed during the early part of 1935, preparation having been made during the latter part of the year 1934.

3. The United Carbon Factory at Sanford, Hutchinson County, Texas.

Prior to August 12, 1931, only casinghead gas residue [fol. 529] was available for carbon black manufacture.

During the year 1934 intense efforts were made by parties interested in stopping the waste of gas well gas residue, to interest the general public in a legislative change that would require in every event utilization of gas well gas after natural gasoline extraction. This interest was aroused by public addresses, radio talks and newspaper advertisements in all parts of Texas and especially in the Texas Panhandle.

Mr. L. M. Fischer, counsel for The Henderson Company, Inc. and The Combine Carbon Company, is shown by the records to have participated in a hearing conducted by a committee of the Texas Senate for the purpose of investigating gas producing practices in the Panhandle Field.

The demand for sweet gas for light and fuel consumption is constantly and substantially increasing in the Panhandle Field, while the demand for gas for carbon black manufacture, though increasing slightly, is comparatively static.

As indicated, in the Texas Railroad Commission's Panhandle order for the month of February the demand for sweet gas is 824,000,000 cubic feet daily and the demand for sour gas is 378,000,000 cubic feet daily.

Prior to August 12, 1931, there was no demand for sour gas from gas wells located in the Panhandle Field, except for local field use in open boilers and other similar equipment. There has never existed in the Panhandle Field a [fol. 530] light and fuel demand for sour gas, i. e., gas with more than one and one-half grains of H_2S per hundred cubic feet except in limited quantities.

Development throughout the Panhandle Field has long since proved it to be the largest known reserve of natural gas in the United States. The demand for gas for light and fuel uses was local and was relatively small, prior to 1926.

The construction of pipe lines began in January 1926, when the Northern Texas Utilities Company started transporting gas to towns in northern Texas, the principal one of which was Wichita Falls. In July of 1927, the Lone Star Gas Company started running gas in Northern Texas, principally into Fort Worth and Dallas. In the early part

of 1928, the South Plains Pipe Line Company and the Cities Service Gas Pipe Line Company started transporting gas from this field, the former into towns south of Amarillo in West Texas and the latter to Kansas City, Missouri. In June of that year, the Canadian River Gas Company began transporting gas into Colorado, principally into the cities of Denver and Pueblo. In November of that year, Texas Panhandle Gas Company began using its line to transport gas into Oklahoma and to Wichita, Kansas. There was relatively little development by pipe lines from this time until June of 1931, when the Panhandle Eastern Pipe Line Company began transporting gas through its line as far as Indianapolis, Indiana.

In October of 1931, the Texoma Natural Gas Company began its operations. The gas transported by this line was [fol. 531] carried to markets in Nebraska, Iowa, and Illinois, the principal market being Chicago and its vicinity. In May of 1932, the Northern Natural Gas Company began its operations in which it transported gas into Nebraska and Iowa, principally into the towns of Des Moines, Iowa, and Minneapolis and St. Paul, Minnesota.

The total length of these nine major pipe lines approximates 4,425 miles and the total capacity thereof is approximately 1,000,000,000 cubic feet of gas per day. A daily average of approximately 300,000,000 cubic feet of gas was transported from the Panhandle Field through these lines during the year 1933 and a daily average of approximately 400,000,000 cubic feet of gas was being transported through said lines during the year 1934; and the daily average amount being transported there through at the present time is approximately 450,000,000 cubic feet.

These major pipe line companies acquired and now hold under lease approximately 850,000 acres of land, which is about 61 per cent of the total gas-producing area in the Panhandle Field, each such company separately owning and operating its own leases. Of the total area proven productive of sweet gas, these major companies own approximately 80 per cent. They have not and are not taking or transporting sour gas through their lines. Unless such gas is treated, it is not suitable for light, fuel and domestic uses. The demand for sour gas for light and fuel uses is [fol. 532] restricted to isolated lease purposes.

Six or seven of the major pipe lines companies have produced and transported to the markets gas produced from

only their own gas leases (or the leases of their respective affiliated or subsidiary companies), and have not purchased gas from other lease owners in the field. Prior to and since the passage of H. B. 266, many of the unconnected lease-owners have repeatedly endeavored to induce these companies to purchase gas from their lands, but without avail. Some of these companies have been and are willing to purchase gas ratably in the field, if all the others would do so, and two companies, have made thirty (30) new connections and are taking ratably from these connections.

In addition to the major pipe lines there are ten additional pipe lines of lesser capacities serving local towns and cities in the immediate vicinity of the field with a throughput capacity of approximately 65,000,000 cubic feet of gas per day. For the most part, these small pipe line companies own their own leases and supply their requirements therefrom, although some of them purchase some of their requirements from other lease owners. Nevertheless, a very large number of separately owned leases have remained without connections with market outlets. In fact, there are more than 90 gas wells that have never had a connection. The pipe line companies, large and small, have taken up all the markets economically and practically [fol. 533] available for sweet gas from the Panhandle Field, and their control thereof constitutes a virtual, if not an actual, monopoly of said markets.

The policy of most of the pipe line companies operating in this field to take gas from only those wells which they owned, to the exclusion of the other operators in the field has resulted in a protracted controversy between them and those operators in this field without a market. This controversy resulted in the passage by the Legislature of the State of Texas of a number of bills, all of which had as their purpose the protection of the right of those operators to sell their gas. In 1931 the Forty-second Legislature passed what is known as the Common Purchaser Act. This law required that pipe line companies taking gas in the state should be considered as a common purchaser and should take gas ratably under conditions which should be prescribed by the Railroad Commission of Texas. As a result of this Act, the Railroad Commission issued orders which had the effect of requiring the distribution of the markets of the pipe line companies among the various pro-

ducers in the field in proportion to the daily open-flow potentials of the wells owned by these producers. This law was attacked by several of the gas pipe line companies in the United States District Court for the Western District of Texas and the Statute and the Orders of the Railroad Commission issued thereunder were stricken down.

As a result of the failure of the Common Purchaser [fol. 534] Act, the Second Called Session of the Forty-second Legislature passed an Act which provided that the Railroad Commission should determine the market demand for any particular field and should allocate the production in this field among the various producers to meet this market demand. The Orders entered by the Railroad Commission as a result of this Act were again attacked by the same pipe line companies in the United States District Court for the Western District of Texas and were stricken down.

As a result of the failure of these Legislative attempts to obtain ratable production, there was passed by the First Called Session of the Forty-third Legislature a bill known as the Stripping Law or the Sour Gas Bill. This bill, in effect, gave to the Railroad Commission the power to permit the use of natural gas for any beneficial purpose. Before the passage of this bill, it had been the policy of the Railroad Commission to permit the use of casinghead gas only in stripping operations, but after its passage, the Railroad Commission began issuing permits to strip dry natural gas. As a result of the issuing of these permits, a number of gasoline plants were built and began to operate in the field.

During the fall of 1933 and the year of 1934 five gasoline extraction plants were built and began operation. In addition, most of the gasoline plants which had been operating entirely on casinghead gas and sour gas well gas, with a substantial part of the residue used in carbon black manu- [fol. 535] facture, were converted into stripping plants. As a result of these developments, by the fall of 1934, in excess of one billion cubic feet of gas was being blown into the air daily. These operations so rapidly depleted the gas field that it soon became evident that some other solution of the problem must be obtained.

[fol. 536] A. M. Crowell further testified as follows:

A part of my duties was the field supervision of the survey of the Panhandle Gas Field during the months of June and July, 1935. During this survey all of the wells connected to the Henderson Gasoline Plant were tested, with the exception of the Henderson Company, Continental-Whittenburg #2 which we were unable to test due to mechanical trouble. All of these tests were corrected for specific gravity and computed on a basis of 14.4 plus 4 ounces as required by House Bill #266. All of these tests were witnessed by a representative of the Henderson Company and a representative of the Railroad Commission. A copy of each test is attached to this affidavit, each copy bearing the signature of the persons witnessing the test. The tests are listed below:

Sweet Gas Wells

Owner	Lease	Well	Witness	Date	Volume
T. M. Deal	Sanford	1	Seiple	6-24-35	31,048
do	do	2	Seiple	6-26-35	4,209
Henderson	Con-Wh	1	Seiple	6-24-35	11,853
do	N. A. S.	2	Seiple	6-24-35	13,006
do	G. P. S.	1	Seiple	6-24-35	27,039
do	Con. Wh	2	Seiple	6-24-35	N. P.
[fol. 537]					
North Amer	Bivins	1	Seiple	6-24-35	983
Polo Oil Co.	Sanford	1	Seiple	6-25-35	23,354
Reliance	do	1	Seiple	6-25-35	13,483
Ruben	Ruben	2	Seiple	6-24-35	8,964
do	do	3	Seiple	6-24-35	19,435
do	do	4	Seiple	6-24-35	20,187
Texarado	Sanford	2	Sever	7-12-35	32,560
do	do	1	Seiple	6-24-35	11,242
Underwood	Johnson	1	Seiple	6-24-35	14,270

Sour Gas Wells

Paramount	Sanford	1	Devore	6-26-35	4,277
do	do	2	Devore	6-26-35	19,425
do	do	3	Devore	6-25-35	15,503
Phillips	Operators	1	Cherry	7- 5-35	27,450
do	do	2	Seiple	6-26-35	5,532
Skelly	Sanford	1	Seiple	6-24-35	18,733

Although the Henderson Company was notified during July as to the potentials of these wells and the gas schedules issued monthly since August, 1935, have carried these potentials, we find the reports of the Henderson Company carrying potentials of their own on these wells.

Since it is my understanding that the Henderson Com-
[fol. 538] pany, from October, 1935, has been granted the

right to produce up to 25% of the potential of the wells connected to its plant, I am making the following tabulation:

Withdrawal Tabulation

Sweet Gas Wells

Owner	Lease	Well	Acres	M. c. f. Potential	Withdrawal Rate Oct.	Nov.	Dec.	Jan.
T. M. Deal	Sanford	1	40	31,048	28%	27%	26%	27%
do	do	2	40	4,209	7%			9%
Henderson	Con Wh	1	89	11,853	22%	25%	28%	27%
do	N. A. S.	2	80	13,006	15%	25%	28%	26%
do	G. P. S.	1	180	27,039	16%	25%	27%	27%
do	Con-Wh	2	95	N. P.				
North Amer	Bivins	1	320	983	25%			
Polo Oil Co.	Sanford	1	10	23,354	17%			
Rehance	do	1	20	13,483	20%			
Ruben	Ruben	2	10	8,904	17%			
do	do	3	10	19,435	20%			
do	do	4	20	20,187	20%			
Texhmdo	Sanford	2	40	32,560	21%			
do	do	4	40	11,242	25%			
Underwood	Johnson	1	40	14,270	16%			
				(15)	(15)	(5)	(4)	(5)

[fol. 539]

Sour Gas Wells

Paramount	Sanford	1	20	4,277	33%	22%	24%	31%
do	do	2	20	19,425	28%	28%	27%	32%
do	do	3	40	15,503	20%	26%	28%	28%
Phillips	Operators	1	23	27,450	25%	26%	27%	27%
do	do	2	23	5,532	21%	26%	27%	27%
Skelly	Sanford	1	40	18,733	20%	27%	27%	34%
				(6)	(6)	(6)	(6)	(6)

As can be seen from the figures above, the Henderson Company withdrew in excess of 25% of the potential of 5 wells in October, 6 in November, 9 in December, and 10 in January.

Since there has been some complaint concerning the amount of gas allowed these wells on the gas proration schedules, it might be pertinent to note the size of the tracts upon which the wells are located, bearing in mind that the acreage unit is 640 acres for the west sweet and sour fields. [fol. 540] GORDON GRIFFIN testified as follows:

I have been associated with the oil industry since 1922, in the capacity of roustabout, rough-neck, pumper, pipe liner, and engineering work since that time, with the exception of the time that I have attended school, studying petroleum engineering.

I received my B. S. Degree from the Texas Christian University in 1929, after which I worked one year in the oil fields in California and Texas; and in 1930 I was employed as petroleum engineer, and since that time I have

been employed as such. My experience has been in practically every field in Texas and numerous fields in New Mexico.

I am at present employed as Chief Petroleum Engineer with the Railroad Commission of Texas, and have held this position over one year. In connection with my duties as Chief Petroleum Engineer with the Commission I have had occasion to become intimately acquainted with the Panhandle Gas Field; and from my study and experience in the Panhandle Field, both in the eastern and western zones thereof, I understand the conditions that prevail there with reference to the production of sour and sweet gas; and my experience in connection with the performance of my duties in this field has brought to light several distinguishing characteristics peculiar to this field, which, so far as I know, do not exist in any other field in the State of Texas. [fol. 541] The chief of these peculiar characteristics are as follows:

This field as a whole contains 1,504,386 acres of proven productivity, of which 1,066,662 acres are productive of sweet gas, that is, gas which is commercially suitable for use as light and fuel, and gas which comes within the definition of sweet gas contained in H. B. 266 and the order of the Railroad Commission dated August 5, 1935. There are 437,724 acres which produce sour gas. A gas not suitable for use as light and fuel unless and except it be chemically treated for the purpose of removing its content of hydrogen-sulphide. It is not practical to so treat this gas in order to render it suitable for use as light and fuel in view of the prohibitive cost of removing its hydrogen-sulphide content. Especially is this true in view of the fact that there is sufficient sweet gas in this area to supply the market needs, provided that use of the sweet gas is conserved for that purpose.

Approximately 300,000 acres in the Panhandle field are productive of both oil and gas.

The Panhandle field is 140 miles long with an average breadth of 10 miles, constituting a common reservoir from which is produced sour gas and sweet gas.

This field is further characterized by a sub-normal weighted average rock pressure of 362.95 pounds, yet having an unusual- large open flow capacity.

[fol. 342] Between 75% and 80% of all carbon black manufactured in the world is manufactured in the Panhandle field. This carbon black has been made from 32 plants scattered over the extent of the Panhandle field, some of which have utilized sour gas and some of which have utilized sweet gas prior to the effective date of H. B. 266 in the manufacture of this carbon black. Carbon black can be manufactured just as efficiently from sour gas as it can from sweet gas. Sour gas cannot be utilized for use as light and fuel because of its hydrogen sulphide content, unless and until it undergoes an expensive treatment for the purpose of removing such hydrogen sulphide content. The sweet gas produced in this field can be used for light and fuel. There is a sufficient amount of sour gas in the Panhandle field to supply all the needs of all the carbon black manufacturing plants without the necessity of using sweet gas. If the carbon black plants that are now operating in the field, or that might thereafter operate, should continue to use sweet gas, the sweet gas reserves in the Panhandle field would be depleted to that extent, and the market for light and fuel would be denied eventually that amount of sweet gas.

These carbon black plants that have been operating in the Panhandle field have approximately a daily capacity of 980,000 m. c. f. *cubic feet* of gas. There is an ample supply of sour gas to take care of their needs, and no condition exists which requires that these carbon black manufac [fol. 343] turers use sweet gas in the manufacture of this product.

Natural gas which contains a hydrogen sulphide conten of less than 1½ grains per one hundred cubic feet of gas is commercially fit for light and fuel purposes without the necessity of treatment to remove such hydrogen-sulphide content. Natural gas which contains in excess of 1½ grains of hydrogen-sulphide per one hundred cubic feet of gas has been found by tests and experience to be unfit for light and fuel purposes in that such hydrogen-sulphide is very corrosive and is otherwise unfit to be used for light and fuel. Very few wells producing in the Panhandle field have a hydrogen-sulphide content of between one and two grains per one hundred cubic feet of gas. Most of such wells contain less than 1% per one hundred cubic feet of gas or less than 2% per one hundred cubic feet of gas. And the Legis-

lature in making the classification in H. B. 266 wherein sweet gas was defined and sour gas was defined was a reasonable, fair and workable classification.

[fol. 544] FRANK F. DUBOSE testified as follows:

Affiant states that he has owned gas producing properties in the Panhandle field since the year 1928; that he engaged in the natural gasoline business for two years prior to February 1936; that he has sold gas to the pipe lines since 1928; and that he is acquainted with the price paid for gas when utilized in carbon black manufacture, for light and fuel and for natural gasoline.

Gas utilized for light and fuel is worth substantially more than gas used in the manufacture of carbon black, when sold at the well, if the price comparison is made there or when sold at the exhaust of natural gasoline plant, if the price comparison is made there.

The average prevailing price for gas used for light and fuel from the Panhandle field is in excess of three cents per thousand cubic feet, while the prevailing price for gas used for carbon black ranges from six-tenths of one cent to one and one half cents per thousand cubic feet. When gas is used for carbon black it is first stripped of its gasoline content and the gasoline plant owner pays the well owner a [fol. 545] royalty of from ten to twenty-five percent of the value of the gasoline content based on charcoal tests. The residue gas, less fuel use in the gasoline plant is then sold to the carbon plant and as a general rule the gasoline plant owner retains one-half of the price of the residue sale and the well owner gets the other half of the sale price. The combined return to the well owner then amounts to from six-tenths of a cent to one and one-half cents. The well owner then pays the land owner one-eighth royalty on his total recovery.

[fol. 546] J. C. CRAIG testified as follows:

That he has an A. B. degree and an M. A. degree from the University of Missouri in Geology: that he has been employed by the Phillips Petroleum Company since October 17, 1929, and has been in the area known as the Pan-

handle of Texas since July 1930, and has held the position of District Geologist since February 1931. That he is familiar with the geological conditions and engineering problems characteristic of this area.

That he was given the assignment and, as a part of his duties, studied the rates of gas withdrawals and estimated the available gas reserves in the Texas Panhandle.

The factors considered in making the estimate on reserves in the Texas Panhandle are as follows:

1. The areal extent of the field.

2. The rock pressures on gas wells, as determined by the individual operators and the Railroad Commission of the State of Texas, which are on file in the Railroad Commission district office at Pampa, Texas.

3. Gas withdrawals, which are filed monthly by the operators and are a matter of public record, on file in the district office of the Texas Railroad Commission at Pampa, Texas.

4. The amount of gas blown to the air from unconnected [fol. 547] oil wells and from both-oil and gas wells which were in the process of being drilled.

These estimates are based on his own observations and estimates of other engineers, geologists and operators in the field and the records of the Phillips Petroleum Company's Gas Testing Department, which makes an attempt to test daily the major portion of the wells which are blowing gas to the air while being drilled.

That the procedure used in the compilation of the gas reserve estimate is as follows:

Rock pressure maps were made on each individual county on a ten-pound-pressure interval. These maps were then plani-metered in order to determine the weighted average rock pressure of each county. The initial rock pressure of 430 pounds was used. The difference between the weighted average pressure at the time the estimate was made from that originally existing in the field, gave the decline in weighted average rock pressure throughout the field. The total accumulative gas withdrawals were divided by the pounds pressure drop, which gave the amount produced per pound drop in pressure. In applying this factor against the original pressure, the total amount of gas

originally in place was determined. From this amount of original gas in place, the total withdrawals were deducted, the difference being the amount of gas still in the reservoir. The amount of recoverable gas was computed on a fifty-pound abandonment pressure.

The above described method is known as the Pressure-[fol. 548] Volume Method and may be expressed by the following formula:

$$V = Q \frac{P_2 - P_t}{P_1 - P_2}$$

where V = volume of gas remaining in the sand, between the rock pressure P_2 and the final pressure on the sand, in cubic feet at atmospheric pressure;

Q = volume of gas produced during a decline in rock pressure from P_1 to P_2;

P_2 = final rock pressure of the decline;

P_1 = initial rock pressure of the decline; and

P_t = pressure in the sand at abandonment.

Affiant further states that in his opinion the above described method is more applicable and reliable in this field than that method known as the Porosity-Area Method in that this method requires factors which are not known, such as the exact thickness of the sand throughout the area and the effective porosity of the producing formation throughout the field.

The estimate of the recoverable gas reserves for the entire Panhandle Field, both sweet and sour, at an abandonment pressure of fifty pounds, a pressure base of 14.65 pounds (14.4 lbs. and 4 oz.) absolute, at 60° Fa-renheit, is as follows:

	Sweet	Sour	Total
Proven Acreage...	1,061,431 acres	415,290 acres	1,476,721 acres
Future Recoverable Gas (From 8-1-35)	15,960,000,000,000 cubic feet	6,230,000,000,000 cubic feet	22,190,000,000,000 cubic feet

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[fol. 549] C. J. Fowlston testified as follows:

I am Production Superintendent in the Panhandle Field for the Northern Natural Gas Company. I have had nine years experience in this field with both sweet and sour gas.

The Northern Natural Gas Company has transported large volumes of gas containing from a slight trace of H_2S to approximately one and one-half grains of H_2S through its lines since January 1931. I have had occasion within the last sixty days to examine our line and find no traces of internal corrosion or other damage to the interior of the pipe line. This company is now connected to and will continue to transport gas containing between a trace of — and one and one-half grains of H_2S per one hundred cubic feet.

[fol. 550] E. P. SCHOCH testified as follows:

I am employed as the professor of Chemistry in charge of Chemical Engineering at the University of Texas and also as Director of the Bureau of Industrial Chemistry, and have been thus employed for more than thirty-five (35) years. In this work, I have to deal with the chemical technology of fuel gas, its chemical composition, and chemical and physical properties. I have studied the economics of manufacturers involving the use of fuel gas and have reached the following conclusions:

Chemical research has just revealed that the gaseous hydrocarbons which are obtained as by-products in the "cracking" of petroleum oils are particularly well suited to manufacture many valuable products; among them are rubber, lacquer, acetic acid, the chemical for making dyes and medicinals, and especially high-grade gasoline. Chemical plants for these manufactures are now being erected in Texas. In the light of this it may be said that cracked gases may now be considered to be so valuable that even their use as fuel may be considered to be wasteful.

Experiments have shown that natural gas can be economically transformed into these cracked gases; hence, they are now seen to be usable for all of the above manufactures. The reason why commercial plants employing natural gas for such manufactures have not yet been [fol. 551] erected is the fact that research has just made us acquainted with this development. In the immediate future, we will probably see plants erected to use gas for this purpose.

The manufacture of carbon black by the "channel" process generally employed at the present time is a process introduced years ago before chemical knowledge had given

us any extensive insight into the properties of natural gas. Research has just developed the fact that carbon black can be made much more efficiently than by the channel process. Among the possible new processes should be mentioned the decomposition of gas by electrical discharge and its combustion in flames under high pressures. Yields of seven to eight pounds of carbon black per one thousand (1,000) cubic feet of gas have actually been obtained and the material is of the same quality as that produced by the channel process. This yield is about five times that obtained by the channel process.

Naturally the commercial employment of such new processes will be slow to be adopted so long as natural gas for carbon black manufacture may be obtained as plentifully and as cheaply as it is today. Yet in the light of our present knowledge, the present method of carbon black manufacture should be condemned as utterly wasteful.

[fol. 552] Rex McRoy testified as follows:

That the Natural Gasoline Plant of Henderson Company Incorporated, located in Hutchinson County, Texas, Section 82, Block 46, H&TC Railroad Company Survey, was completed and started operation on or about the 29th day of August, 1929. The Natural Gasoline Plant of the Portland Gasoline Company located in Section 163, Block 3, I&GN Railroad Company Survey, Gray County, Texas, was completed and commenced operation on or about the 1st day of January, 1929. The Natural Gasoline Plant of Phillips Petroleum Company located near Sanford, Texas, Section 83, Block 46, H&TC Survey, Hutchinson County, Texas, was completed and commenced operation on or about the 20th day of May, 1928.

Affiant Rex McRoy is the Panhandle District Superintendent of Natural Gasoline Production with the Phillips Petroleum Company and has lived in Panhandle, Texas, since 1925. He has been constantly familiar with all natural gasoline plant operations since 1925.

[fol. 553] **Defendant's Documentary Evidence**

1. Rule 41 of the rules and regulations for the conservation of crude petroleum oil and natural gas, contained in Oil and Gas Circular No. 16-B prescribed by the Railroad Commission of Texas, and which said rule was in force and effect in 1926, and has been unchanged up to the date of this trial.

Rule 41. Burning of Carbon Black.—(a) The use of natural gas within the State of Texas for the purpose of obtaining therefrom, by the process of burning, the carbon black content, is hereby prohibited where there is any reasonable expectation, presently or in the near future, of the utilization of the gas for domestic or manufacturing purposes.

(b) The erection, enlargement, maintenance, and operation of any plant or plants in Texas for the purpose of burning natural gas to obtain therefrom the carbon black content is prohibited within this State, except when allowed by special permit granted by the Railroad Commission of Texas after due hearing.

(c) Permit valid only for one year from the date of issuance may be granted after hearing had upon petition with ample notice to the public, where it is made to appear by the evidence that it is advisable as a conservation measure to allow natural gas, after the gasoline content has been extracted, to be burned for the purpose of obtaining therefrom carbon black, and where it is shown that the gas territory from which such carbon black plant is to be supplied is not sufficient in volume to justify its transportation for domestic or industrial use, or is so situated as to preclude a reasonable future demand for the gas in domestic or industrial consumption, or that it is impracticable to seal in the gas and conserve it in its stratum until it is practicable [fol. 554] to transport same and use it in domestic and industrial consumption. Provided, however, that where it shall be established that residue gas from gasoline plants is waste, and there is no public need or demand for said gas, after proper notice and public hearing the Commission may grant permits to manufacture carbon black from said residue gas or from casinghead gas from which the gasoline content has been extracted, valid for a period of five years.

Every permit so granted shall be so restricted as to safeguard and protect the public interest.

(d) In every petition for permit provided for by these rules there must be set forth the name or names of the person, firm, co-partnership, association or corporation desiring same; the capital to be invested, whether paid in or to be thereafter subscribed and to be paid in; the location, character, value, and capacity of the plant to be established; the location of the gas field; its area, potential volume, and rock pressure of known wells in the field, and the character of the gas, and generally every fact necessary to be developed in the determination of the advisability, from a conservation standpoint of granting the permit.

(e) Every permit granted under these rules shall expire automatically twelve months from the date of its issue, except permits to burn residue gas granted under the last provision of Section (c) hereof, and it shall be unlawful thereafter to continue the operation of such carbon black plant without obtaining a new permit based on conditions existing at the time of expiration of the previous permit.

(f) This rule and regulation shall become effective immediately upon adoption by the Railroad Commission.

[fol. 555] 2. PRELIMINARY REPORT OF SENATE INVESTIGATING COMMITTEE

Austin, Texas, September 9, 1934.

To the Legislature of the State of Texas:

We, your Committee authorized under Senate Simple Resolution No. 30, adopted February 27, 1934, as amending Senate Simple Resolution No. 120, Acts of the Regular Session of the Forty-third Legislature, for the purpose of looking into and determining the loss, theft, waste and dissipation of oil and gas in Texas for the purpose of determining appropriate legislation to correct same:

Beg to make this preliminary report to the Forty-third Legislature. Your Committee held hearings in the City of Amarillo, Texas, April 9, 10, 11, and 12, 1934. This meeting was well advertised and was largely attended by many witnesses from all angles of the controversy, including farmers, big land owners, gas and oil well owners, and rep-

resentatives of pipe lines, processing plants, and carbon black plants, all of whom were given an opportunity to testify. A copy of this testimony is herewith attached. The members of your Committee visited the field and made a personal inspection of the production method and uses to which natural gas is being put. We submit the following brief of said testimony for your consideration.

We find it is the world's largest known gas field and is one common reservoir or pool. It extends from the southeast portion of Wheeler County through Gray, Carson, [fol. 556] Hutchinson, Potter, Hartley and Moore Counties. It is about one hundred and twenty-five miles in length and varies in width from five to forty miles. The productive area embraces at least 1,350,000 acres of land, of which 982,324 are capable of producing sweet gas and the other land is capable of producing sour gas, that is, gas containing Hydrogen sulphide.

We find there are:

Natural gas wells	750
Bradenhead wells	50
Plugged back and depleted wells	135
Total gas wells	935
Oil wells connected with plants	1217
Oil wells not connected	668
Total number of producing wells	1885
Total number of wells	2820

The greater majority of oil wells are producing vast quantities of natural gas.

Daily open flow capacity of all gas wells 17,600,000,000 cubic feet. Daily potential oil production 165,574 barrels.

Depth of wells 2000 to 3000 feet at an average cost of $12,000.00 per well.

The record shows:

Gasoline Extraction Plants

Number of plants	40
Estimated daily capacity (cubic feet)	1,810,000,000
[fol. 557] Number of gas wells connected to plants	338
Number of oil wells connected to plants	1217

Gas content varies from .264 to .34, or about one gallon of gasoline to each 3000 cubic feet of gas. Price of gasoline at time of hearing was about 1½¢ per gallon.

The income to the land owner from gas stripped of its gasoline content and then blown into the air was one-eighth of from ten to twenty-five per cent of the value of the natural gasoline.

We find that there are nineteen gas pipe lines transporting gas from this field to Colorado, Nebraska, Iowa, Illinois, Missouri, and elsewhere. Some of said pipe lines do not strip the gas of its gasoline content at or near its production, and we have been informed that the transporting of gas heavily laden with gasoline content is dangerous. Evidence indicated that pipe line companies own eighty per cent of the gas bearing acreage in this field.

The Railroad Commission reports show that approximately one billion seven hundred million feet of gas are now being produced daily. Pipe lines take four hundred million feet; carbon black plants probably four hundred and fifty million feet, and estimating gas used for fuels, it means nearly a billion feet is blown into the air each day.

According to the records of the Commission for the month of February, 1934, 569,201,000 cubic feet of sweet gas and 724,437,000 cubic feet of sour gas was run to stripping [fol. 558] plants daily. Some plants stripped sweet gas exclusively.

Carbon Black Plants

Number in the field	25
Estimated daily capacity (cubic feet)	592,000,000
Daily consumption (cubic feet)	443,483,000

The income from gas used for carbon black was one-eighth of one cent additional to that which was stripped and then blown in the air.

We find many thousands of people employed in carbon black industries.

We find from the records that the value to the land owner per section of land when the gas is stripped varies from an estimated minimum of $1184.00 to an estimated maximum of $2960.00, depending upon the producer's contract with the stripping plant. We find further that the value to the land owner per section when used for heat and light purposes is from $24,000.00 minimum to approximately $48,-

000.00 maximum, depending upon the variations of prices paid by the pipe line companies to the producers. The latter figures are based upon the estimated footage of gas in place, this being fifteen million cubic feet per acre and does not take into consideration the time element in producing the gas. It should be noted that the value for stripping purposes should be realized only, over not to exceed five years, whereas the value for light and fuel purposes would be spread over an estimated period of 75 years.

[fol. 559] The State received in taxes during the year 1932, ending September 30th:

From casinghead plants	$35,603.49
From natural gas	115,669.29

For the year ending September 30, 1933, the State received:

From casinghead plants	$31,771.00
From natural gas	156,002.34

It is estimated that the field originally contained twenty trillion cubic feet of gas, and that four trillion cubic feet have been withdrawn since its discovery in 1918. The original rock pressure of the field was 430# and the rock pressure the date of the hearing was 380#, and in some acres it was found to be as low as 200#.

The average price paid by stripping plants for gas that prevailed during the year 1933 was .292, and during the year 1932 the average price was .225, and the average price for gas used in stripping plants computed by the Comptroller was .001076 per thousand cubic feet on which taxes were paid for 1933. A minimum price per 1000 cubic feet for gas for fuel and lighting purposes was two cents. At the rate of a billion cubic feet blown into the air daily, with the State realizing no revenues thereon, the field will become exhausted in approximately five years. On the other hand, if the reservoir is protected for future fuel and lighting purposes the State should collect revenues from taxes at the present gross production rate in the sum of $380.00 [fol. 560] per day. This potential revenue would be realizeable over the estimated period of 75 years for the life of the field for fuel and lighting purposes, the ultimate revenue recovery being based of course, upon the continued use of natural gas for such purposes. If the billion cubic

feet of gas blown into the air was made into carbon black it would produce 66,000 pounds of carbon black at a minimum price of four cents per pound, or $2640.00 worth of carbon black, meaning a loss in taxable values to the municipalities, counties and State of $2640.00 worth of real property.

The probable life of gas reserve of this area, if production is not limited to light and fuel, will be in direct proportion to amount of withdrawal to sixteen trillion feet estimated to be in the reservoir at this time.

Recommendations

We recommend that appropriate legislation be passed to prevent waste in the production of gas:

(1) That pipe line companies, casinghead plants and carbon black plants should be required to take ratably a sufficient amount of gas to meet the legitimate demands, and that all persons producing gas and oil should make correct reports to the Railroad Commission and to the Comptroller and that all parties in this field be restricted to a ratable production of gas irrespective of waste and that the land owners should receive just compensation for the gas taken from under their lands.

[fol. 561] (2) That a tax of one-half cent per thousand cubic feet be placed on the production of natural gas in Texas.

(3) That all taxes paid to the State for the production of natural gas be refunded on such gas as is repressured into the same horizon from whence it came.

(4) We recommend the passage of legislation to equitably allocate the market for gas used for light and fuel among the several owners of a common pool, and when a ratable market on a fair basis and at a reasonable price is provided, the use of gas then be restricted to light and fuel usage, as Article 6008, Revised Statutes, originally provided.

(5) In areas productive of gas containing a high content of hydrogen sulphide or other substance rendering it unfit for light and fuel usage, and where the cost of treating such gas for the removal of its objectionable contents is prohibitive, it is recommended special permits be granted

to allow the use of such gas for the manufacture of gasoline and the residue be utilized in the manufacture of carbon black or other similar uses, and under no circumstances that the residue gas be blown into the air.

(6) That the issuance of further carbon black permits, and the renewal of existing permits be contingent upon the requirement that carbon black plants take their gas requirements ratably from all such gas as is available for this usage.

(7) That legislation be passed restricting the amount of gas produced with oil and we think that the ratio of gas produced with oil should be materially decreased and be- [fol. 562] lieve that an efficient gas-oil ratio should be determined and enforced in the Panhandle field, and in all other fields as well. We think that gas necessarily produced in the efficient operation of an oil well should be first stripped of its gasoline content, then used in the manufacture of carbon black, or used for light and fuel, of course, exceptions would have to be made where there are no carbon black plants accessible, and no industrial use is available.

(8) We recommend that there be levied and collected a tax of 2¢ per thousand cubic feet upon all gas produced and sold at the well at a price of less than 4¢ per thousand cubic feet.

(9) We recommend legislation requiring all natural gas produced in Texas to be stripped of its gasoline content before moving more than twenty miles from point of origin in pipe lines.

(10) It is further recommended that any taxes above referred to be levied as an occupation tax on the occupation of producing natural gas and not as a tax on the property itself.

In closing this report we deplore the large wasteage of gas which now exists in the Panhandle Oil and Gas Field, however, the conservation of a resource naturally necessitates control and usage of the production by the body entrusted with the regulation of such resource, in order to protect the various interests involved. We think it is safe to say that the so-called waste problem in the Panhandle

Gas Field would have been solved long before this time if the provisions of Section 4 of the Oil and Gas Conservation Law had been carried out as the Legislature intended, [fol. 563] all of which goes to show that conservation is impossible without an equitable allocation of the market requirements.

Unless the comprehensive legislative program herein outlined, can be enacted and enforced, the State cannot continue its conservation policy.

Respectfully submitted, Beck, Chairman. Woodruff, Vice-Chairman. Redditt, Secretary.

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3. Carbon Black Permit

Carbon Black

Case No. 56

Rule 41

Applicant: F. C. Henderson, Amarillo, Texas.

On the 27th day of February, 1930, came on for further consideration, upon the records already made and the further showing to this Commission of additional facts warranting further consideration of the application of F. C. Henderson for a permit to construct a plant and burn residue casinghead gas from casinghead gasoline plants operating in Hutchinson County, Texas, in the manufacture of carbon black; and the Commission having duly and carefully considered the same and being fully advised in the premises, is of the opinion that it is in the interest of [fol. 564] conservation of natural resources to grant said permit under the restrictions and provision set forth in this order:

It Is, Therefore, Ordered that the petitioner, F. C. Henderson, be and he is hereby authorized and permitted to erect and construct and for a period of five years to maintain and operate a plant for the manufacture of carbon black from waste residue gas from oil wells only, now operating or hereafter to operate in Hutchinson County, Texas; together with such machine shops, tool houses, warehouses, workmens quarters, pipe lines, tramways and other

appurtenances as may be necessary or required for the efficient operation of said plant in keeping with modern and accepted practices, for all of which this shall be its sufficient authority and permit, said carbon black plant to be located at a point which will be satisfactory to all interested parties, at some point convenient to the casinghead gasoline plant located on the east half of the west half of the south eighty acres of the north half of Section 82, block 46, H&TC RR. Company survey in Hutchinson County, Texas, upon the following conditions:

If, at any time during the life of this permit, the available supply of natural gas for domestic or industrial purposes in the territory practically accessible by pipe line or otherwise to the gas supplying said carbon black plant is insufficient to meet the demands of such use, then the Railroad Commission of Texas shall have the right to divert from this plant an amount of gas sufficient to meet such demands; if the owner of said carbon black plant and [fol. 565] other parties shall fail to agree upon the price of such gas, then said Commission shall fix the price, and if, at any time in the field where this plant is located, it should be proven by general use that it is practical, economical, and in the interest of conservation to return residue casinghead gas to the producing strata, and that gas used in this plant is needed for the purpose, than this permit may be terminated by this Commission on ninety days notice after hearing.

The Commission grants this permit as a conservation measure. If, at any time, it should appear that the operation of a carbon black plant under this permit is in violation of any rule or order of the Railroad Commission of Texas relative to the conservation of oil or gas or either of them, or should the owner or operator of said plant consent to or connive at the violation of any rule or order, the Railroad Commission shall have the right, upon its own motion or upon complaint, to cancel this permit, after hearing.

This permit is granted for the erection and operation of a plant to consume 10,000,000 cubic feet of residue casinghead gas per day of twenty-four hours; and may, upon the approval of the Commission, be assigned by applicant:

The plant authorized to be erected and operated under this permit shall be erected as speedily as possible and

shall in any event be completed and in operation six months from this date. Immediately upon the completion of such plant, the permittee shall file with the Railroad Commission of Texas, a certificate of completion and this permit shall automatically expire five years from the date thereof, but [fol. 566] in no event later than the 27th day of August, 1935, and neither the permittee nor its assigns shall be permitted to operate such plant after the expiration of five years unless and until a new permit shall be obtained, based upon the conditions existing at the time of the expiration of permit hereby granted.

February 27, 1930.

——— ———, Chairman. (Signed) C. V. Terrell, Lon A. Smith, Commissioners.

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4. Carbon Black Permit

This permit is on the same form and contains substantially the same terms and provisions as No. 3 next preceeding. It recites that the applicant was Western Carbon Co., Dallas, Texas, that the hearing was held on October 16, 1928, and the permit issued on October 26, 1928; the plant to be located in Gray County, Texas. Term: five (5) years; capacity: 12,000,000 cubic feet per day.

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5. Carbon Black Permit

This permit is on the same form and contains substantially the same terms and provisions as No. 3, above. It recites that the applicant was Cabot Carbon Co., Boston, Mass., that the hearing was held on July 6, 1929, and the [fol. 567] permit issued July 18, 1929; the plant to be located in Gray County, Texas. Term: five (5) years; capacity: 10,000,000 cubic feet per day.

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6. Carbon Black Permit

This permit is on the same form and contains substantially the same terms and provisions as No. 3, above. It recites that the applicant was F. C. Henderson, Amarillo,

Texas, that the hearing was held on August 26, 1929, and the permit issued on October 2, 1929; the plant to be located in Hutchinson County, Texas. Term: five (5) years; capacity: 6,000,000 cubic feet per day.

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7. Carbon Black Permit

This permit is on the same form and contains substantially the same terms and provisions *on* No. 3 above. It recites that the applicant was Western Carbon Co. Dallas, Texas, that the hearing was held July 27, 1929, and the permit issued December 12, 1929; the plant to be located in Gray County, Texas. Term: five (5) years; capacity: 10,000,000 cubic feet per day.

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8. Carbon Black Permit

Carbon Black

Case No. 54

Rule 41

Applicant: Western Carbon Company, c/o Judge J. W. Hassell, Magnolia Building, Dallas, Texas.

[fol. 568] Austin, Texas, May 5, 1934.

On the 20th day of April, 1934, came on for consideration the application of Western Carbon Company for renewal of the permit in the above numbered and entitled cause to burn residue gas in the manufacture of carbon black in a plant known as the Forrest E. Gilmore Company's casinghead plant in Gray County, Texas, erected, maintained and operated under a permit issued by this Commission by its order of December 12, 1929, and the Commission having duly and carefully considered the same and being fully advised in the premises, is of the opinion that the application is in the interest of conservation of the natural resources of the State of Texas and should be granted:

Therefore, it is Ordered that the petitioner, Western Carbon Company be, and it is hereby authorized and permitted

for a period of five years, to maintain and operate said plant for the manufacture of carbon black from residue gas from casinghead gasoline plants which utilize natural gas from oil wells only, now operating or hereafter to operate in Gray County, Texas, together with all appurtenances which may be necessary or required for the efficient operation of said plant in keeping with modern and accepted practices, for all of which this shall be their sufficient authority and permit to continue to operate, subject to conditions stated herein, said plant to be operated for the manufacture of carbon black from and after June 12, 1934, for a period of five years or until not later than the 12th day of June, 1939. The permittee shall not be permitted to operate said plant after the expiration of said term of five years unless and until permission so to do has been secured under the [fol. 569] conditions existing at the time of the expiration of the permit hereby granted.

If, at any time during the life of this permit, the available supply of natural gas for domestic or industrial purposes in the territory practically accessible by pipe line or otherwise to the gas supplying said carbon black plant, is insufficient to meet the demands of such use, the Railroad Commission shall have the right to divert from this plant an amount of gas sufficient to meet such demands; in the owner of said carbon black plant and other parties fail to agree upon the price of such gas, then the Commission shall fix the price; and, if at any time in the field where this plant is located, it should be proved by general use that it is practical, economical and in the interest of conservation to return casinghead gas to the producing strata, and that gas used in this plant is needed for the purpose, then this permit may be terminated by this Commission on thirty (30) days' notice, after hearing.

It is expressly provided that the gas to be burned for carbon black under this permit must be made immediately available to such pipe lines as may have gathering lines laid to and connected or ready to connect with the gas lines of said carbon black plant, in response to demand in emergency during shortage or impending shortage of gas to meet urgent and immediate needs for temporary domestic and manufacturing or industrial purposes, provided that the owner of the pipe line making the emergency demand for the gas provides the necessary installation of pipes, fittings, meters,

etc., for the purpose of taking said gas, at its own cost and [fol. 570] expense and that in the event parties interested can not agree upon the price to be paid for the gas so diverted the price of said gas shall be fixed by the Commission as hereinbefore provided, but in no event shall response to the emergency demand of gas be delayed because of failure to agree upon the price of said gas.

The plant to be operated under this permit shall consume ten million (10,000,000) cubic feet of gas per day of twenty-four hours.

If, at any time during the life of this permit, it appears that the plant authorized under said permit is being operated in violation of any rule or order of the Railroad Commission of Texas, or if the permittee or their assigns are contributing in any way to the violation, or are encouraging the violation of any such rule or order relative to the conservation of oil or gas, the Railroad Commission shall have the right, upon complaint or upon its own motion to cancel this permit, after hearing.

(Signed) Lon A. Smith, Chairman. —— ——, Commissioner. (Signed) Ernest O. Thompson, Commissioner.

Attest: (Signed) C. F. Petet, Secretary.

[fol. 571] 9. Carbon Black Permit

Carbon Black

Case No. 71

Rule 41

Applicant: F. C. Henderson, Amarillo, Texas.

Austin, Texas, September 18, 1934.

On the 17th day of August, 1934, came on for consideration the application of F. C. Henderson for a permit in the above numbered and entitled cause to burn residue gas in the manufacture of carbon black in a plant known as The Henderson Company in Section 82, I & G N RR Company Survey No. 46, in Hutchinson County, Texas and the Com-

mission having duly and carefully considered the same and being fully advised in the premises, is of the opinion that the application is in the interest of conservation of the natural resources of the State of Texas and should be granted:

Therefore, it is Ordered that the petitioner, F. C. Henderson be, and he is hereby authorized and permitted for a period of five years, to maintain and operate said plant for the manufacture of carbon black from residue gas from casinghead gasoline plants which utilize natural gas now operating or hereafter to operate in Hutchinson County, Texas, together with all appurtenances which may be necessary or required for the efficient operation of said plant [fol. 572] in keeping with modern and accepted practices, for all of which this shall be their sufficient authority and permit to continue to operate, subject to conditions stated herein, said plant to be operated for the manufacture of carbon black from and after December 18, 1934, for a period of five years or until not later than the 18th day of December, 1939. By the acceptance of this permit the permittee agrees to take ratably of all residue gas tendered to said plant to be used for the manufacture of carbon black. The permittee shall not be permitted to operate said plant after the expiration of said term of five years unless and until permission so to do has been secured under the conditions existing at the time of the expiration of the permit hereby granted.

If, at any time during the life of this permit, the available supply of natural gas for domestic or industrial purposes in the territory practically accessible by pipe line or otherwise to the gas supplying said carbon black plant, is insufficient to meet the demands of such use, the Railroad Commission shall have the right to divert from this plant an amount of gas sufficient to meet such demands; if the owner of said carbon black plant and other parties fail to agree upon the price of such gas, then the Commission shall fix the price; and, if at any time in the field where this plant is located, it should be proved by general use that it is practical, economical and in the interest of conservation to return casing head gas to the producing strata, and that gas used in this plant is needed for the purpose, then this permit may be terminated by this Commission on ninety days' notice, after hearing.

It is expressly provided that the gas to be burned for [fol. 573] carbon black under this permit must be made immediately available to such pipe lines as may have gathering lines laid to and connected or ready to connect with the gas lines of said carbon black plant, in respo-se to demand in emergency during shortage or impending shortage of gas to meet urgent and immediate needs for temporary domestic and manufacturing or industrial purposes, provided that the owner of the pipe line making the emergency demand for the gas provides the necessary installation of pipes, fittings, meters, etc., for the purpose of taking said gas, at its own cost and expense and that in the event parties interested can not agree upon the price to be paid for the gas so diverted the price of said gas shall be fixed by the Commission as hereinbefore provided, but in no event shall response to the emergency demand of gas be delayed because of failure to agree upon the prices of said gas.

The plant to be operated under this permit shall consume not to exceed twenty-five million (25,000,000) cubic feet of gas per day of twenty-four hours.

If, at any time during the life of this permit, it appears that the plant authorized under said permit is being operated in violation of any rule or order of the Railroad Commission of Texas, or if the permittee or their assigns are contributing in any way to the violation, or are encouraging the violation of any such rule or order relative to the conservation of oil or gas, the Railroad Commission shall have the right, upon complaint or upon its own motion to cancel this permit, after hearing.

[fol. 574] Railroad Commission of Texas, by (Signed) Lon A. Smith, Chairman. (Signed) C. V. Terrell, Commissioner. (Signed) Ernest O. Thompson, Commissioner. (Seal.)

Attest: (Signed) C. F. Petet, Secretary.

10. Monthly Gasoline Report

Railroad Commission of Texas

Oil and Gas Division—Panhandle District

Monthly Gasoline Plant Report Showing Gas Production and Disposition for the Month of June 1935

Company: The Henderson Company. Address: Amarillo, Texas.

Plant: Sanford. Location: Sanford, Texas.

Capacity: — cu. ft.

Daily Average Intake for the Month, 122,394,000 cu. ft.

Total Daily Potential Volume of all Wells Connected, 548,632,000 cu. ft.

Plant Intake Pressure, 72. Plant Intake Vacuum, None.

Average Plant G.P.M., .348. Sulphur Content per 100 cu. ft. of Residue; 18.

[fol. 575] Daily Average Residue Disposition

Extraction Loss, 367,182 cu. ft.
Plant and Lease Use, 8,000,000 cu. ft.
Delivered to Carbon Black Plant, 15,531,566 cu. ft.
Industrial and Domestic Line, 4,000 cu. ft.
To Air, 98,491,252 cu. ft.
Total (Must Balance with Reverse Side): 122,394,000 cu. ft.

Name of Carbon Black Companies Receiving Residue	Plant and Location	Average Daily Volume Delivered During Month
Combine Carbon Co.	Sanford, Texas.	15,531,566 cu. ft.
.....	.....	..... cu. ft.

Name of Company Receiving Residue Gas for Industrial and Domestic Use	Average Daily Volume Delivered During Month
Town of Sanford	4,000 cu. ft.
.....	..... cu. ft.

Gas Pipe Lines—Drilling Wells—Raw Gas used for makeup to field—etc.

Remarks

Daily Average Gasoline Production

Grade Gallons

. . . .

I, W. R. Sever, being first duly sworn, on oath state that I have knowledge of the facts and matter herein set forth and that the same are true and correct.

(Signed) W. R. Sever (Representative of Company).

Subscribed and sworn to before me this 8 day of July, 1935. (Signed) T. J. Hordeupyle (Notary Public), Hutchinson County, Texas.

O-979-1134-lm.

[fol. 578] **Complainant's Rebuttal**

N. B.—Map referred to herein sent up in the original by order of the court.

Testimony

C. Don Hughes further testified as follows:

I have read Exhibit No. 63 introduced by the defendants, which apparently purports to be a statement from F. V. L. Patten on the subject, "Drainage Conditions in the Sanford Area", attached to which are tables 1 and 2 and a purported pressure map, which statement is neither signed nor sworn to by Mr. Patten. Tables 1 and 2 attached to such purported statement attempt to contrast certain conditions between the wells connected with The Henderson Company plant and those not connected to such plant in the Sanford area. Although the table takes into consideration several wells that were until recently owned by gas pipe line companies and from which no gas was produced until recently for casinghead and carbon black purposes, and although such table takes into consideration a number of wells located a great distance from the Sanford pool and should not be considered as a part of the Sanford area, yet, from an analyzation of the purported statement, the following appears:

The fourteen wells belonging to The Henderson Company and classified as sweet gas wells in the Commission's order of July, 1935, are located upon leases totalling 980 acres; they have produced a total of 60,558,045 M.C.F. of gas, or an average of 61.8 million per acre. The rock pres-

sure of such fourteen wells is 196.91 pounds, and their open flow totals 197,900,000 cubic feet. For the purpose of comparison with the fourteen sweet wells of The Henderson Company, I have selected from table No. 2 fourteen wells connected with the Phillips Petroleum Company plant at Sanford, Texas, many of which wells the Phillips Petroleum Company own, such selection being made in order to obtain [fol. 579] similar acreage, open flow, and apparent productive life as that of the Henderson Wells, which wells so selected are:

Alamosa No. 1, Sanford Lease
Alamosa No. 2, Sanford Lease
Alamosa No. 3, Sanford Lease
Antelope No. 3, Sanford Lease
Antelope No. 4, Sanford Lease
Huber No. 1-b, Sanford Lease
Muen Rio No. 1, Sanford Lease
Phillips No. 1, Land Lease
Phillips No. 2, Land Lease
Phillips No. 1, McMann Lease
Phillips No. 1, Pool Lease
Phillips No. 2, Pool Lease
Skelly No. 1, Bivins Lease
Williams No. 1, Sanford Lease,

and as to these wells, such table shows that they are located upon 740 acres; that they have produced 55,413,223 M.C.F. of gas, or an average of 74.9 million per acre; that their rock pressures averaged 183 pounds, and their open flow totals 200,800,000 cubic feet. It is thus seen that these fourteen wells connected with the Phillips Petroleum Company plant at Sanford, Texas have produced an average of 13,000,000 cubic feet more per acre and have 13.91 pounds lower average rock pressure than the fourteen wells connected with the Henderson plant and involved in this cause. By reason of the lower pressure condition prevailing in said wells connected with the Phillips Petroleum Company plant, gas is migrating from the wells of the Henderson Company to them, and they are actually draining gas from [fol. 580] the Henderson leases, involved in this cause, and this drainage will increase as the Henderson wells are shut in and not permitted to produce.

Of the thirty-three wells set out in table No. 2 of the purported statement of Mr. Patten, only eleven are shown by the tests of the Commission to contain sweet gas, while the remaining twenty-two have been classified by the Commission as sour gas wells. The average rock pressure of such twenty-two sour wells is 192.4 pounds, or 4.5 pounds less than the average pressure of the fourteen sweet wells of The Henderson Company, involved in this cause.

The average rock pressure for all of the Hutchinson County sour gas wells, according to the tests of the Railroad Commission, as shown upon the schedules of the Commission, is 172.5, an average of 24.41 pounds lower than the fourteen sweet wells of The Henderson Company, involved in this cause. As a result, there is not question in my opinion that there is now a migration of gas from the sweet wells of The Henderson Company, involved in this cause, to the sour wells, taking place, and this migration will be increased in the future if The Henderson wells are shut in.

The pressure contour map shown by Dr. Patten in the immediate area around Sanford is in general about right, but in detail wrong. The locations of the wells, as shown on the map, in many instances are so incorrect that it is difficult to check his accuracy; all of the wells in the area are [fol. 581] not shown; the Henderson Company plant is incorrectly located; of more importance is the incorrect location of the well showing 212 pressure in the south part of Section 80, which well is actually located in the very northern part of the section, and destroys his conclusion to the effect that the small pressure basin in the Sanford area is closed on the east, as he shows. As a matter of fact, this small pressure basin shown by Mr. Patten is an irregularity in the much larger pressure trough extending from nearly the west line of Hutchinson County eastward, widening and deepening to the edge of the field east of Borger. But, an inspection of the map attached to such purported statement readily discloses that the low contour as shown on such map is in the sour area. It also discloses that all of the Henderson sweet gas wells are west or southwest of the low enclosure and that actual drainage is occurring from them to the low area. Such map further discloses that the sour area covering and immediately adjacent to the low contour as shown on such map contains twenty actively produced,

and now producing, sour gas wells, of which only four are connected with The Henderson Company.

I have prepared a map covering the entire southwest quarter of Hutchinson County, which I attach hereto, and upon which I have delineated by curves the pressure condition obtaining in such area and have located the sweet and sour gas line, from which the pressure trough I referred to above can be readily seen, with the Sanford area as a widening area near its west end, but with the low near Borger to the east.. The present sour and sweet line is shown in red and it is apparent that practically from the west line of Hutchinson County the drainage is along this line eastward from the sweet into the sour. Such condition is true also from the limits of my map eastward throughout the [fol. 582] entire balance of the sour area to its end in Gray County, south of Pampa; that is, the drainage is definitely from the sweet into the sour area. Northwest of the limits of my map a low pressure area, near the Shamrock Oil & Gas Company's plant northeast of Dumas in Moore County, has started a similar picture there.

The only exceptions to his definite and certain drainage now taking place from the sweet area into the sour are in the lean areas along the west edge of the field in Moore and southeast Hartley Counties, and the recently exploited area in northeast Moore County. In this last mentioned area the Phillips Petroleum Company and Anderson-Kerr have been drilling many wells; a large pipe line has been constructed by Phillips Petroleum Company from that area to its gasoline plants in Hutchinson County, and it may be literally said that "It won't be long now", until the drainage in that area likewise will be from the sweet to the sour.

[fol. 583] C. Don Hughes further testified as follows:

I have read the affidavit of F. V. L. Patten, dated February 26, 1936, in which Mr. Patten has estimated the sour gas demand for the Panhandle field and refers to the affidavit of T. C. Craig, geologist for the Phillips Petroleum Company in reference to his estimates of recoverable gas from the sweet and sour areas in the Panhandle reservoir, and from which Mr. Patten draws the conclusion that the volume of recoverable sour gas is 28.1 of the total recoverable gas in the West Panhandle field. This conclusion on

the part of Mr. Patten is entirely erroneous. In view of the fact that it is based on the conclusions reached by Mr. Craig it is necessary to consider the conclusions reached by Mr. Craig as to the recoverable gas in the sweet and sour areas of the West Panhandle field.

At first glance, it would appear that from Mr. Craig's affidavit his estimate of original gas in place was considerably more than my estimate, as shown in my first supplemental affidavit, but after analyzing the same there is not so much difference when certain factors are noted. In the first place, his figures are computed to different base pressures than mine, thereby rendering a larger estimate on his part to the extent of about 11 per cent. The greatest difference, however, is that in my estimate I have considered 336,000 acres less in the Panhandle reservoir than Mr. Craig has considered, for the reason that it is my opinion that this amount of acreage has practically no gas under it, while Mr. Craig shows such acreage of equal reserve capacity as all the other acreage in the field. In Mr. Craig's estimate, he gives equal weight acre by acre to the sweet [fol. 584] and sour areas of the field, which I cannot subscribe to, due to the differences in thickness of pay, porosity, and open flow capacity. Because of such factors, I find the sour gas area originally had less gas in place than the sweet area. But, whether he or I be correct in our estimate of the original gas in place in the Panhandle reservoir *reservoir* is immaterial to the erroneous conclusion reached by Mr. Craig with reference to the percentages of the present recoverable sweet and sour gas in the Panhandle field. Assuming, for the sake of argument, that Mr. Craig is right in his estimate of gas originally in place, he shows at present that the recoverable gas in the field is divided between the sour and sweet areas on a direct proportion to the number of acres in each the sour and sweet areas. Regardless of the original amount of gas in place, this conclusion cannot follow, for under the present conditions the pressures are lower in the sour areas than in the sweet area, and assuming, which Mr. Craig has done, that originally the sweet and sour areas had equal gas in place per acre, there cannot now be such equality, as his estimate shows, for the reason that the sour gas wells average 94 pounds less pressure than the sweet wells, which absolutely shows that there is a tremendously less amount of recoverable sour gas per

acre than recoverable sweet gas per acre in the West Panhandle reservoir.

Mr. Patten has estimated the sour gas demand in the West Panhandle field at 372,242 M.C.F. daily. It is apparent that this figure is based on some assumption never before taken into account in arriving at the "demand" in order to show less disparity between permitted withdrawals in the sour and sweet areas. The order of the Railroad [fol. 585] Commission for the month of January found the sour gas demand of the Panhandle field to be 520,496 M.C.F. daily. Nothing has changed in the physical setup of the field, the operating conditions, or capacities of the plants, to cause any reduction in the sour demand below that found by the Commission in its order effective on January 1, 1936.

[fol. 586] J. H. Mann further testified as follows:

He is thoroughly familiar with the market value of carbon black produced in the Panhandle field, f. o. b. in such field, and is further thoroughly familiar with the market value of gas produced in the Panhandle field and sold for industrial and commercial uses in said field; and is thoroughly familiar with the amount of gasoline content contained in the gas in the Panhandle field and the present market price for natural gasoline produced in the Panhandle field.

That the present market price for carbon black, f. o. b. Panhandle field, is four cents per pound. That the present market price for natural gasoline produced in the Panhandle field is three cents per gallon, f. o. b. Panhandle field. That the average recovery of carbon black from one thousand cubic feet of gas in the Panhandle field is one and one-half pounds, and that the average recovery of natural gasoline from one thousand cubic feet of gas produced in the Panhandle field is one-half gallon. Therefore, the value in the Panhandle field of one thousand cubic feet of natural gas, utilized for the manufacture of natural gaso- [fol. 587] line and carbon black is seven and one-half cents.

Affiant further states that gas produced in the Panhandle field is sold for industrial and commercial use in said field from one to five cents per thousand cubic feet and that the average price therefor would not exceed three cents

per thousand cubic feet. Affiant knows of a number of specific instances where gas is produced in the Panhandle field and transported in pipe lines from fifteen to twenty miles and sold for fuel purposes for as low as four cents per thousand cubic feet.

[fol. 588] C. A. SEIPLE further testified as follows:

That he is Plant Superintendent of The Henderson Company, complainant in the above cause, and that he has charge of the operation of the gasoline plant belonging to such company, located at Sanford, Texas; that he has personally investigated the operating conditions existing surrounding the wells connected with The Henderson Company plant and involved in this cause; that affiant finds that the Phillips Petroleum Company, which likewise owns and operates a gasoline manufacturing plant at Sanford, Texas, is taking and receiving gas from the following wells:

Sinclair Prairie Johnson D-1
Dixon Creek Williams Johnson-Yantes 1
Alamosa No. 5
Phillips Bivins No. 1
Skelly Bivins No. 1
Alamosa No. 3
Land No. 2,

that one or more of all of said wells above mentioned are either direct, diagonal, or practical offsets to one or more of the wells of The Henderson Company, involved in this cause; that all of the wells above mentioned, from which the Phillips Petroleum Company is receiving gas, are sweet [fol. 589] gas wells with the exception of the Land No. 2 and Alamosa No. 3; that the gas taken by the Phillips Petroleum Company therefrom goes into the Phillips Petroleum Company's main gathering system and is intermingled with sour gas and is utilized for gasoline and carbon black manufacture at the Phillips Petroleum Company plant at Sanford, Texas, and the carbon plants of the United Carbon Company at Sanford, Texas.

Affiant further says that according to the records of the Railroad Commission the total daily allowable production

authorized by the Commission for the month of November, 1935, from the following wells:

Skelly-Bivins No. 1
Alamosa No. 5
Phillips-Bivins No. 1,

was 1,515,000 cubic feet; that the Phillips Petroleum Company, during such month, actually produced and received from such wells an average of 6,735,000 cubic feet per day, or an excess over the Commission's allowable of 5,220,000 cubic feet per day; that for the month of December, 1935, the total daily allowable for such wells, as fixed by the Commission, was 2,283,000 cubic feet, and that the Phillips Petroleum Company actually produced and received therefrom 5,256,000 cubic feet per day, or an excess over the Commission's allowable, of 2,973,000 cubic feet per day.
[fol. 590] That all of the wells above described, offsetting the wells of The Henderson Company as above mentioned, have been producing continuously since August 1, 1935, and the gas produced therefrom utilized by Phillips Petroleum Company in the manufacture of casinghead gasoline, and either supplying the residue to the United Carbon Company for the manufacture of carbon black or popping the same into the air.

[fol. 591] R. S. McConnell testified as follows:

My name is R. S. McConnell; I am a resident of Gray County, Texas, and have been for a long period of time and own property in what is known as the Panhandle Gas Field and know of my own knowledge that individual owners of gas wells whose gas goes into the pipe lines to be used for light and fuel purposes, get four ($0.04) cents per 1000 cubic feet.

[fol. 592] Agreement as to Statement of Evidence

It is agreed by and between the parties hereto that the above and foregoing is a full, true and correct statement in narrative form, (except a part of the cross-examination of F. V. L. Patten, an expert witness) of the evidence adduced upon the hearing of Complainant's Application for a

permanent injunction in the above entitled matter, in addition to which certain original exhibits are sent along with the record by order of the court, and together, it is agreed, the same shall constitute the Statement of Evidence on this appeal.

F. W. Fischer, L. M. Fischer, Attorneys for Complainants. Wm. McCraw, Wm. Madden Hill, Attorneys for Defendants.

ORDER APPROVING STATEMENT OF EVIDENCE

The above and foregoing Statement of Evidence, having been agreed to by counsel, is hereby approved and ordered filed as a part of the Record of this appeal.

And wherever the same is in question and answer form it is deemed to be in such form as is reasonably necessary for a full understanding of such testimony.

J. C. Hutcheson, Jr., United States Circuit Judge. McM. T. M. Kennerly, United States District Judge. McM. Robert J. McMillan, United States District Judge.

At San Antonio, Aug. 3rd, 1936.

[File endorsement omitted.]

[fol. 593] IN UNITED STATES DISTRICT COURT

[Title omitted]

APPLICATION FOR ORDER INSTRUCTING THAT ORIGINAL EXHIBITS BE TRANSMITTED TO THE SUPREME COURT OF THE UNITED STATES—Filed August 3, 1936

To the Honorable Judges of Said Court:

Come Now the parties to the above entitled and numbered cause, by their respective attorneys of record, and respectfully show to the Court that the following exhibits introduced in evidence during the trial of the above cause are maps, charts, forms, and diagrams which cannot be accurately reproduced in such form as to be incorporated in the transcript, and that same, in their original forms,

should be examined by the Supreme Court of the United States in order to fully understand the testimony of witnesses making reference to such maps, charts, forms, and diagrams.

Same being as follows:

1. Exhibits 70 to 74, inclusive, being Gasoline Plant Reports on forms. (August, 1935, October, 1935, November, 1935, January, 1936 & December, 1935).

2. Exhibit 79, being twenty-one (21) Gas Well Test Tickets on forms.

3. Exhibits to affidavits and supplemental affidavit of C. [fol. 594] Don Hughes, being large map of Oil & Gas Area in the vicinity of Henderson Gasoline Plant, Hutchinson County, Texas; map of the Southwest Quarter of Hutchinson County, Texas, showing Gas Pressures Contoured on 50 lb. intervals, and Sweet and Sour demarcation; small map of Texas Panhandle, in colors; chart of West Panhandle Gas Field Sour and Sweet Acreage Comparison; chart of West Panhandle Gas Field, Sour and Sweet, Total Open Flow Comparison.

4. Exhibit 80, being large map denominated "The Oil and Gas Journal's Map of Natural Gas Trunk Pipe Lines in the United States."

5. Exhibit 92, being an article in "The Oil Weekly".

6. Exhibit attached to affidavit of A. M. Crowell, being a map.

7. Exhibit attached to Report on "Drainage Conditions in the Sanford Area", by F. V. L. Patten, being map denominated "The Henderson Co. Rock Pressure Contours, July 1935".

Wherefore, said parties respectfully move the Court to enter an order directing the Clerk of this Court to transmit said exhibits to, and place same in the custody of, the Clerk of the Supreme Court of the United States, at Washington, D. C., together with a certified copy of said order, prior to the date of filing and docketing said cause in the said Supreme Court of the United States.

(Signed) F. W. Fischer, L. M. Fischer, Attorneys for Complainant. (Signed) Wm. McCraw, Wm. Madden Hill, Attorneys for Defendants.

[fol. 595] IN UNITED STATES DISTRICT COURT

ORDER RE ORIGINAL EXHIBITS—Filed August 3, 1936

The above and foregoing application having been duly presented, and it appearing that it is necessary and proper that the maps, charts, forms, and diagrams designated therein, which were introduced in evidence in the trial of this cause, and which cannot be reproduced and incorporated in the transcript, should be inspected by the Supreme Court of the United States upon hearing this appeal.

It is Therefore Ordered that said maps, charts, forms, and diagrams described in the above and foregoing application be certified by the *cou*rk of this Court and be transmitted to the Clerk of the Supreme Court of the United States at Washington D. C., together with a certified copy of this order, prior to the filing and docketing of said cause in said Supreme Court of the United States, to be considered along with the transcript of the record upon the hearing of this appeal.

Dates, this 3rd day of August, 1936.

—— ——, Circuit Judge. —— ——, District Judge.

(Signed) Robert J. McMillan, District Judge.

At San Antonio.

[File endorsement omitted.]

[fol. 596] IN UNITED STATES DISTRICT COURT

[Title omitted]

STIPULATION AS TO CONTENTS OF TRANSCRIPT OF RECORD—Filed August 3, 1936

It is agreed by and between the parties hereto, through their respective attorneys of record, that the transcript of record to be filed in the Supreme Court of the United States in connection with the appeal heretofore allowed herein in the above cause, shall include the following:

1. Caption.
2. Bill of Complaint of The Henderson Company.
3. Defendants' Reply to the Bill of Complaint of The Henderson Co.

4. Order Allowing Amendment to Bill of Complaint.
5. Amendments to Bill of Complaint of The Henderson Company.
6. Defendants' Reply to the Amended Bill of Complaint.
7. Reply of The Henderson Company to Answer of Defendants.
8. Order denying Temporary Restraining Order.
9. Order constituting Three-Judge Court.
10. Opinion of the Court on Application for Interlocutory Injunction.
11. Decree denying interlocutory injunction.
12. Opinion of the Court on Application for Permanent Injunction.
13. Final Decree.
14. Findings of Fact and Conclusions of Law.

[fol. 597] 15. Petition for Allowance of Appeal and Order Allowing Appeal.

16. Assignments of Errors.
17. Cost Bond on Appeal and Approval thereof.
18. Statement Disclosing Basis of Jurisdiction of Supreme Court Under Rule 12.
19. Acknowledgment of Service of the Statements and Notices Provided for in Rule 12 and Waiver.
20. Waiver of Citation and Notice of Appeal.
21. Statement of Evidence Under Equity Rule 75, Agreement of Counsel to same, and Order Approving Statement of Evidence.
22. Motion to Send up Original Exhibits and Agreement of Counsel.
23. Order of Court to transmit Original Exhibits to Clerk of Supreme Court.
24. Stipulation of Parties as to Contents of Record.
25. Certificate of Clerk of this Court.

Dated this the 30th day of July, 1936.

(Signed) F. W. Fischer, L. M. Fischer, Attorneys for Complainant. (Signed) Wm. McCraw, Atty. Gen. of Texas; (Signed) Wm. Madden Hill, Ass't. Attorney General, Attorneys for Defendants.

[File endorsement omitted.]

[fol. 598] Clerk's certificate to foregoing transcript omitted in printing.

[fol. 599] IN UNITED STATES DISTRICT COURT

[Title omitted]

PETITION FOR EXTENSION OF TIME FOR DOCKETING CASE AND FILING RECORD WITH THE CLERK OF THE SUPREME COURT —Filed July 23, 1936

To the Honorable Court Aforesaid:

Now comes The Henderson Company, complainant in the above entitled and numbered cause, and respectfully represents and would show unto the court that in accordance with the provisions of Supreme Court rules Nos. 10 and 11, as amended and revised on May 31, 1932, complainant is required upon appeal to docket this case and file the record thereof with the clerk of the Supreme Court of the United States by or before the return day, which would be forty days from the date of the issuance or signing of the citation for appeal, or the signing of the waiver of citation, which in this instance would be forty days from June 23, 1936, thus requiring complainant to docket this case and file the record thereof with the clerk of the Supreme Court of the United States on or before the 2nd day of August 1936. Complainant would further show that by reason of the extensive and voluminous record necessary to be prepared by the clerk of this court in this cause upon appeal, and by reason of the great amount of other pressing business which the clerk of this court is required to take care of at the same time and during the preparation of this cause for appeal, it will be practically impossible to have this case ready for docketing and the record thereof prepared for filing with the Supreme Court [fol. 600] of the United States in the time required under the aforesaid rules 10 and 11.

Wherefore, in order to give and allow the clerk of this court sufficient time in which to properly prepare the record in this case for appeal, and in order that complainant may have sufficient time for docketing and filing record of this case with the clerk of the Supreme Court of the United States, as required by Supreme Court rules 10 and 11, your petitioner prays for an order of this court granting and allowing an extension of sixty days from and after August 2, 1936 for the docketing of said case and filing record

thereof with the clerk of the Supreme Court of the United States.

F. W. Fischer, L. M. Fischer, Attorneys for Complainant, The Henderson Company.

ORDER EXTENDING TIME

The above and foregoing petition, upon good cause having been shown, is hereby granted and The Henderson Company, complainant in this cause, is hereby given and granted an extension of sixty days from August 2, 1936, within which to docket said case and file the record thereof on appeal with the clerk of the Supreme Court of the United States.

Witness my hand this 23 day of July, A. D. 1936.

Robert J. McMillan, United States District Judge.

[fol. 600½] [File endorsement omitted.]

[fol. 601] IN SUPREME COURT OF THE UNITED STATES

STATEMENT OF POINTS TO BE RELIED UPON BY APPELLANT AND DESIGNATION OF PARTS OF THE RECORD TO BE PRINTED—Filed September 25, 1936

To the Honorable Supreme Court of the United States:

Now Comes The Henderson Company, Appellant in the above entitled cause, and designates as follows the points upon which it will rely in this court:

Point One

The Act under attack is such that the Court has power to make inquiry of, and to determine as a matter of law, whether or not such Act and the orders of the Commission, made in pursuance thereto, bear a reasonable relation to the purposes sought to be accomplished by such Act and orders.

Point Two

That under the facts in evidence, it has been conclusively established that the provisions of said Act here under attack

bear no reasonable relation to the purposes sought to be accomplished thereby; that there is no fact basis for such part of said Act on the part of the Legislature, and the same is purely arbitrary and unreasonable, and particularly so in its application to complainant and its properties, and said Act is therefore unconstitutional and void to the extent of the provisions herein complained of.

[fol. 602] Point Three

That the Legislature of Texas did not have the authority, under its police power, to go to the extent that it did go in said Act, in prohibiting the use of sweet gas for the manufacture of carbon black and dedicating the same to the specific uses set out in said Act, and in doing so, it abused such power, and its act is not founded upon fact and is arbitrary, unreasonable and capricious.

Point Four

That the enforcement of the provisions of said Act complained of, and the orders of the Railroad Commission promulgated thereunder, against complainant and its property, will not only deny to complainant the right to reasonably use its property for useful purposes, without physical waste thereof, but will absolutely destroy such property, in that such act and orders dedicate the same to a use for which there is no outlet or market afforded complainant, and thus the same amounts to the taking of complainant's property without due process, in violation of the Fourteenth Amendment to the Federal Constitution.

Point Five

That the enforcement of the provisions of said Act complained of, and the Orders of the Railroad Commission promulgated thereunder, against complainant and its property, will discriminate between complainant and others of the same class and similarly situated in that they deny complainant the right to use its gas for the manufacture of carbon black, whereas they permit complainant's neighbors, engaged in the same character of business, to use the same character of property for the manufacture of carbon black, and thus amounts to the taking and appropriating of com-

plainant's property for a specific and restricted use, for which complainant is denied any market or outlet, and thus, [fol. 603] complainant is denied the equal protection of the law as guaranteed by the Fourteenth Amendment to the Constitution of the United States.

Point Six

That the provisions of said Act complained of are discriminatory in that they arbitrarily distinguish between sweet and sour gas contained in a common gas reservoir, and particularly the West Panhandle field, where complainant's properties are situated, and restrict the use of sweet gas, when as a matter of fact there is no basic difference between sweet and sour gas contained in the West Panhandle field as to its B. T. U. or heat content and its carbon black productivity, the only difference between such gas being one of price, to-wit, the small cost of eliminating the sulphur content from such sour gas. Thus the provisions of said Act in so classifying sweet and sour gas and restricting the use of sweet gas are discriminatory against complainant and its property.

Point Seven

That the provisions of said Act complained of, and the Orders of the Railroad Commission promulgated thereunder, restricting the use of sweet gas for fuel purposes discriminate against complainant and its property in favor of others who are permitted under said Act and Orders to use gas for fuel purposes, whatever the necessity for such use may be, in that they deny the use of sweet gas for the manufacture of carbon black when as a matter of fact the heat units contained in such gas are actually utilized and applied in such manufacture for the purpose of generating heat in order to break down the chemical constituents of said gas and separate the carbon from the other elements contained therein.

[fol. 604] Point Eight

The provisions of said Act complained of, and the exercise of purported authority thereunder by the Railroad Commission, constitute an attempt to impair the obligations of pre-existing contracts and so are void under Article I, Section 16 of the Constitution of the State of Texas.

In addition to the above designated points, Appellant here adopts each and all of its Assignment of Errors as further and additional points to be relied upon in this appeal.

Appellant further states that only the following parts of the Record as filed in this court are deemed necessary to be printed for the consideration of the points set forth and referred to above, viz:

1. Bill of Complaint (pages 2 to 42, inclusive), but omitting therefrom that part of the exhibit attached thereto appearing on pages 37 to 39, inclusive, as the same appears in the Statement of Evidence;

2. Defendant's Original Answer (pages 43 to 67, inclusive), but omitting therefrom Exhibit A attached thereto, appearing on pages 68 to 71, inclusive, as the same appears in the Statement of Evidence;

3. Amendment to Bill of Complaint (Aug. 29, 1935), (pages 72 to 77, inclusive);

4. Amendment to Bill of Complaint (Feb. 28, 1936), (pages 78 to 93, inclusive);

5. Respondents' Answer to the Amendment to Bill of Complaint, (pages 94 to 100, inclusive);

6. Complainant's Reply to the Answer of Defendants, (pages 101 to 104, inclusive);

7. Opinion of Court on Application for Preliminary Injunction, (pages 107 to 113, inclusive);

8. Order Denying Application for Temporary Injunction, (pages 114 to 115, inclusive);

9. Opinion of Court on Application for Permanent Injunction, (pages 116 to 129, inclusive);

10. Order Denying Permanent Injunction, (pages 130 to 132, inclusive);

[fol. 605] 11. Findings of Fact and Conclusions of Law, (pages 133 to 151, inclusive);

12. Petition for Allowance of Appeal and Order Allowing Same, (pages 152 to 154, inclusive);

13. Assignment of Errors, (pages 155 to 165, inclusive);

14. Appeal Bond and Approval thereof, (pages 167 to 168, inclusive);

15. Waiver of Citation and Notice of Appeal, (page 214);

16. Statement of Evidence, (pages 216 to 591, inclusive);

17. Agreement as to Statement of Evidence and Order of Court Approving Statement of Evidence, (page 592);

18. Application and Order of Court to Transmit Certain Original Exhibits to Clerk of the Supreme Court of the United States, (pages 593 to 595, inclusive);

19. Stipulation as to the Contents of the Record, (pages 596 to 597, inclusive);

20. Petition for Extension of Time for Filing Record and Order of Court Extending Time, (separate instrument);

21. This instrument,

Dated This 18th day of September, 1936.

F. W. Fischer, L. N. Fischer, Attorneys for Appellant.

[fol. 606] Acknowledgment of Service of Points to be Relied Upon and Designation of Parts of the Record to be Printed

Come Now Ernest O. Thompson, C. V. Terrell, and Lon A. Smith, composing the Railroad Commission of Texas, and William McCraw, Attorney General of Texas, Appellees, and acknowledge receipt of the Statement of the Points to be Relied Upon by Appellant and Designation of Parts of the Record to be Printed in the Supreme Court of the United States, and said Appellees hereby waive further service or proof thereof in connection with same.

Dated This 19th day of September, 1936.

Wm. McCraw, Attorney General; Wm. Madden Hill, Assistant Attorney General, Attorneys of Record for Ernest O. Thompson, C. V. Terrell, and Lon A. Smith, Composing the Railroad Commission of Texas, and William McCraw, Attorney General of Texas.

[fol. 607] [File endorsement omitted.]

Endorsed on cover: Enter F. W. Fischer. File No. 40,937. W. Texas, D. C. U. S. Term No. 397. The Henderson Company, appellant, vs. Ernest O. Thompson, C. V. Terrell, and Lon A. Smith, etc., et al. Filed September 25, 1936. Term No. 397, O. T., 1936.